

CIO

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ALL HANDS ON TECH

Below decks with the
Queen Mary 2's IT

Page 72

MIDDLEWARE EVOLVES

Why the new middleware
is an enterprise must

Page 89

"We became a poster child
for failed implementations,"
says Roland Wolfram, VP of
Nike's Asia-Pacific division.
It was, he says, a bum rap.

NIKE REBOUNDS

How Nike survived a \$100 million
supply chain disaster and a seven-year,
\$500 million ERP implementation Page 56

BY CHRISTOPHER KOCH

Introducing the new Microsoft Office System.

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Live Communications Server 2003
Exchange Server 2003
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Solutions

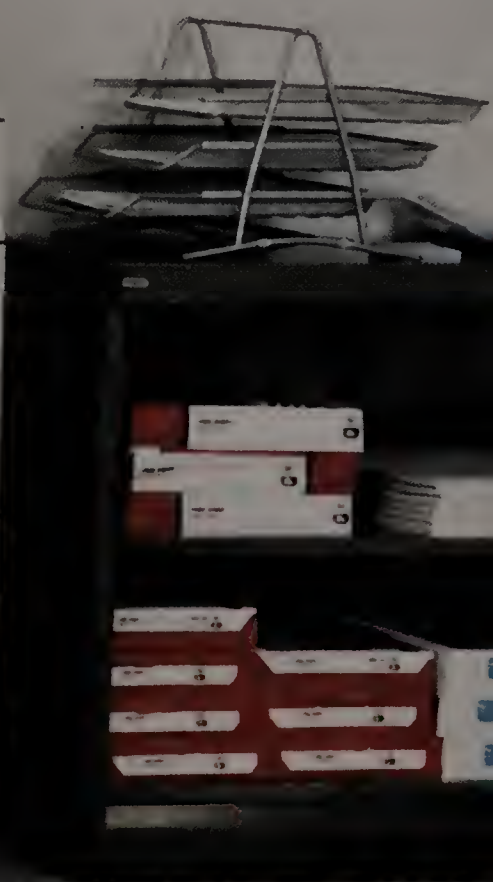
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Rights Management Services



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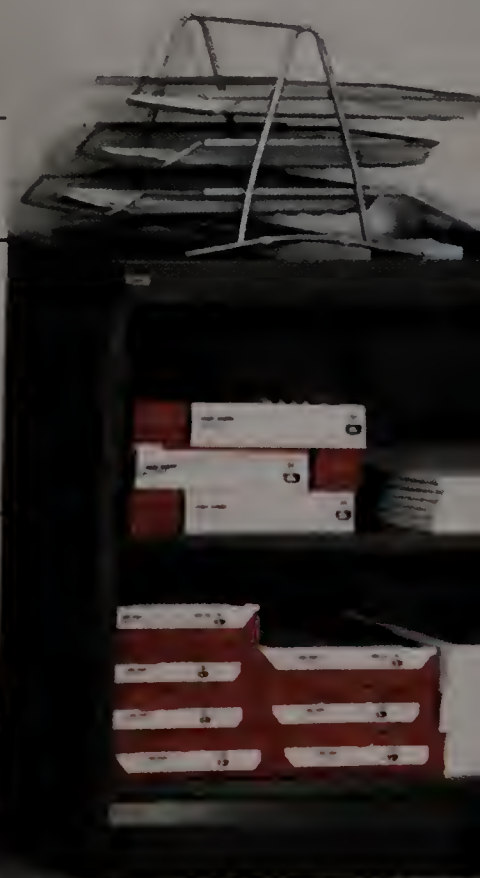




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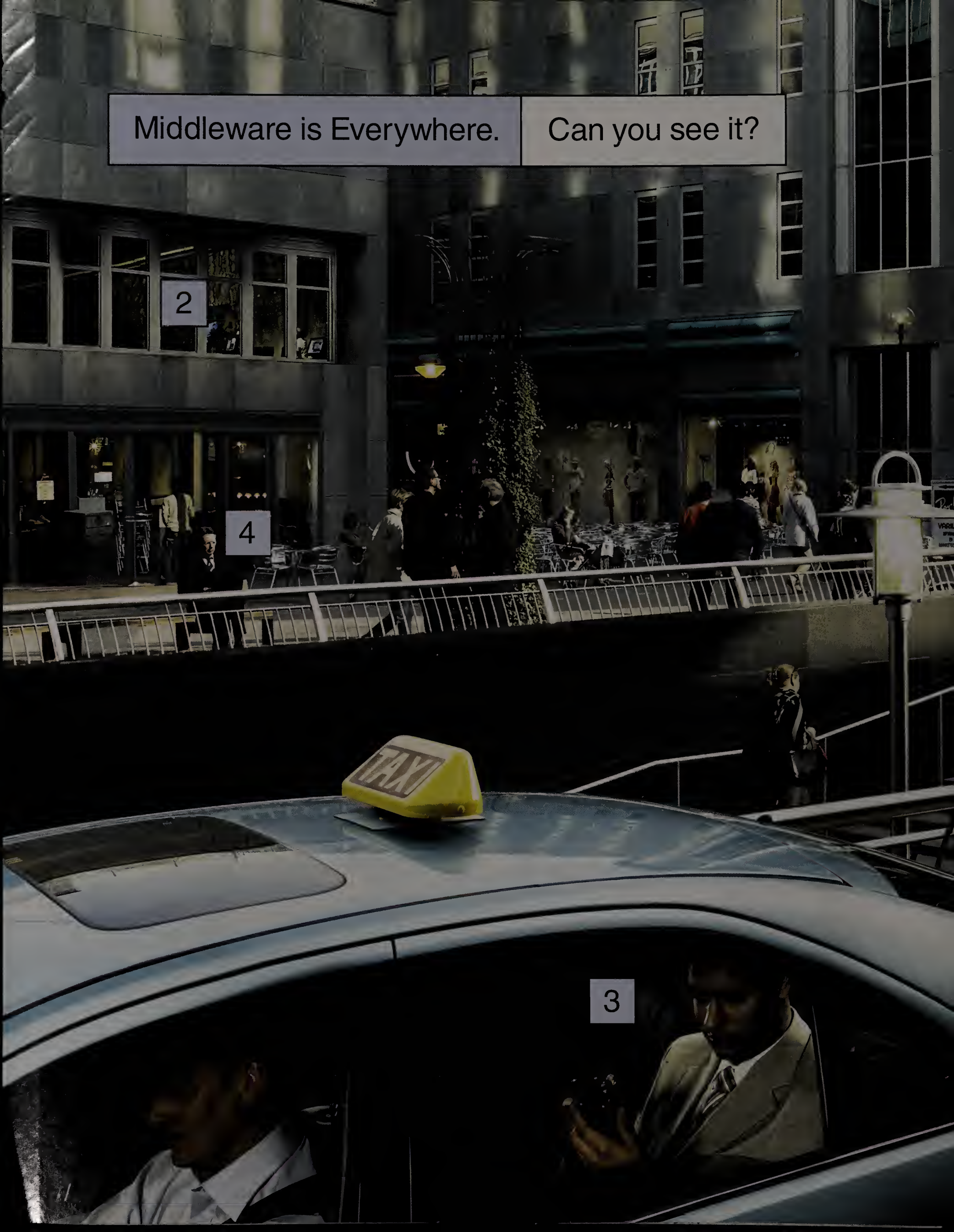
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2

4

3





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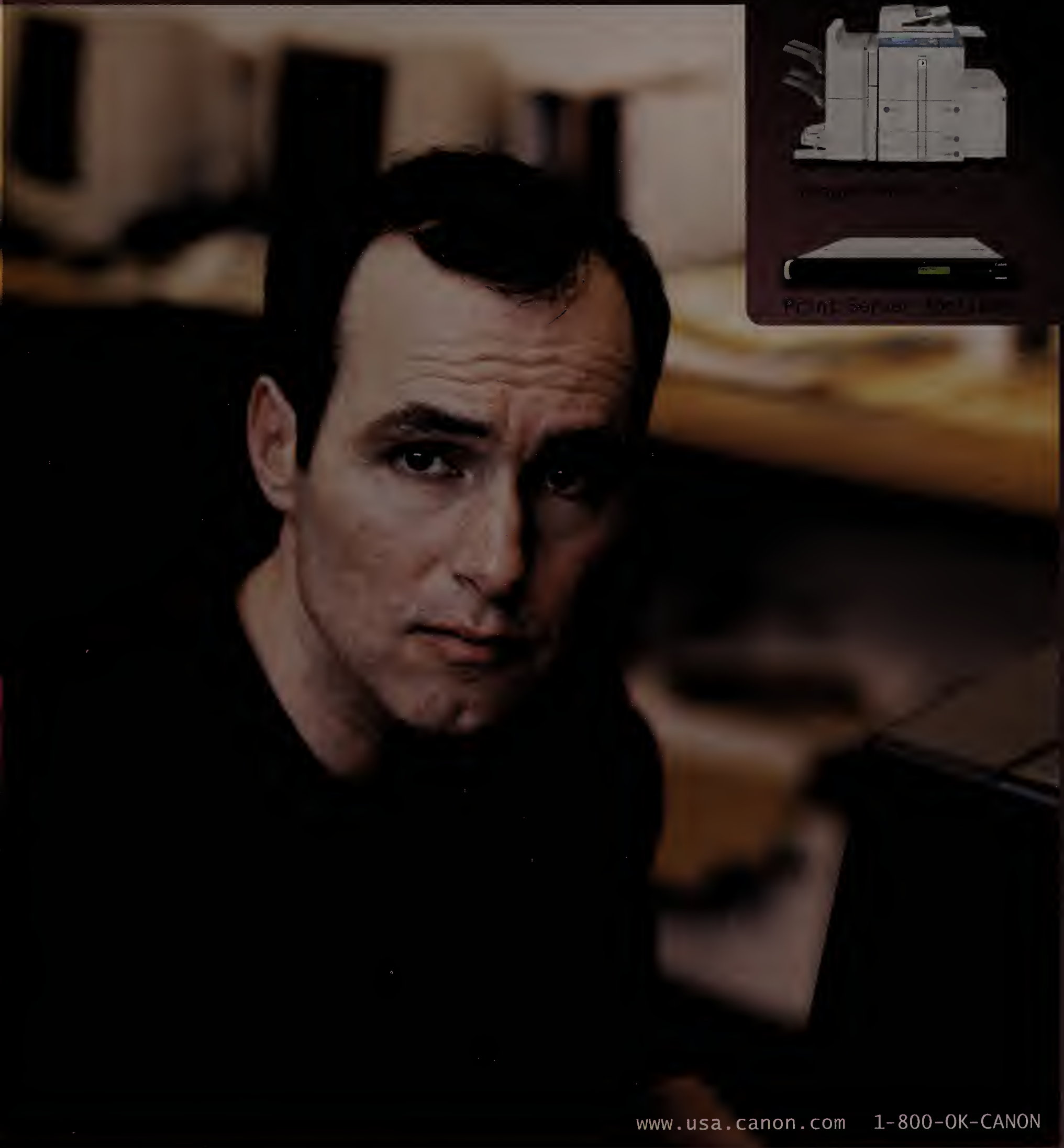
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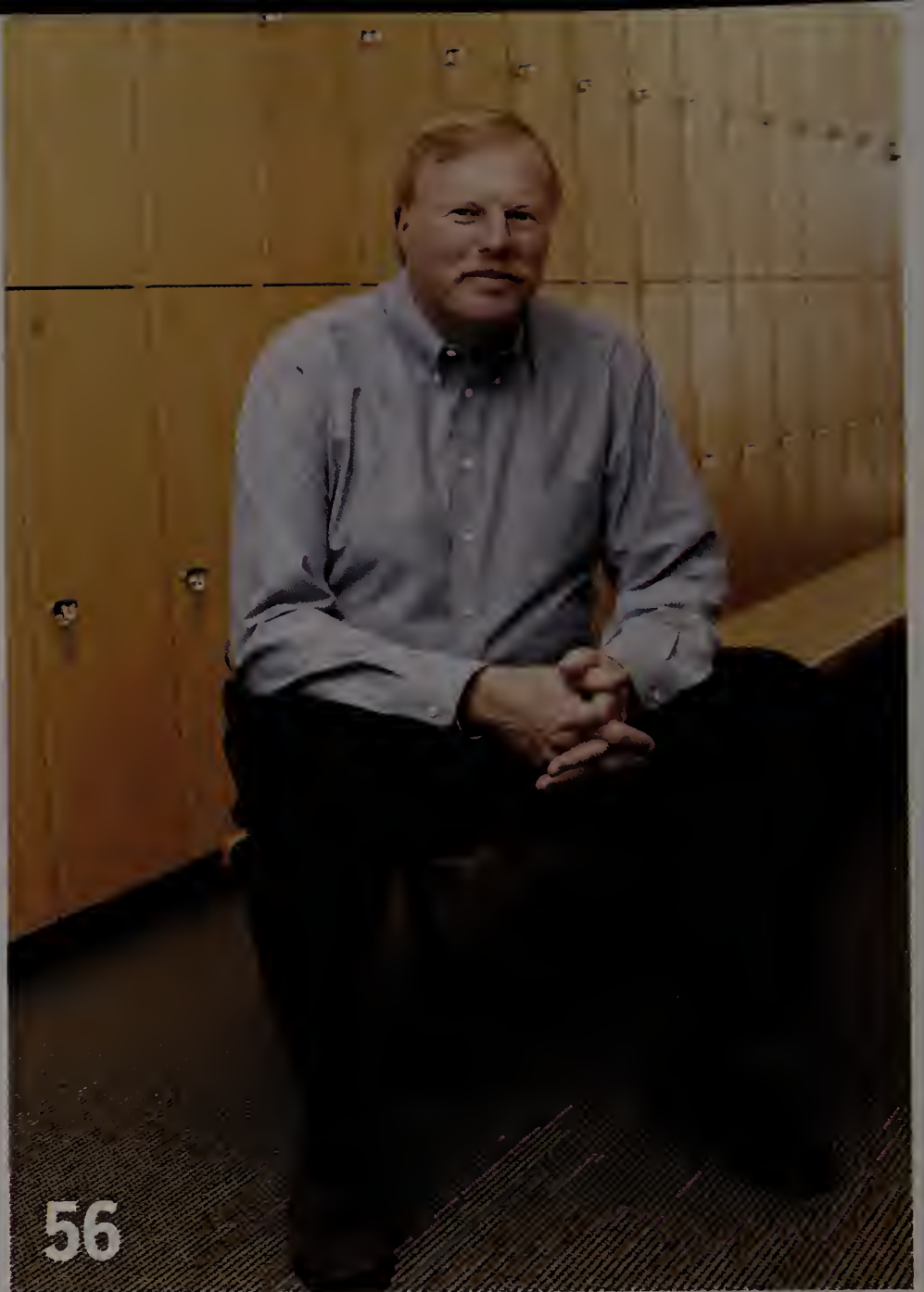
SUPPLY CHAIN MANAGEMENT | 56

Nike Rebounds

How (and Why) Nike Recovered from Its Supply Chain Disaster

Too many Air Garnetts. Too few Air Jordans. Nike lost money, time and a measure of pride when its demand-planning software led it astray. How did it recover? Patience, perseverance and, most important, an understanding of what it was trying to accomplish in the first place. *By Christopher Koch*

COVER PHOTO BY TIM JONES



"Could we have done a better job with software quality? Sure. Could the planners have been better prepared to use the system before it went live? You can never train enough," says Nike CIO Gordon Steele.

Features

OFFSHORE OUTSOURCING

Regulations: What to Worry About | 64

As the offshoring debate heats up, CIOs are scrambling to meet the demands of current and pending legislation. Here's what's real, what's not and how to cope. *By Ben Worthen*

INFRASTRUCTURE

All Hands on Tech | 72

Designing an IT system from scratch can be both daunting and thrilling. Now imagine building IT remotely for the world's newest, biggest ship. The story of how IT supports the *Queen Mary 2*, a veritable floating city. *By Todd Datz*

PERSONAL COMPUTING

Four Concept Computers | 81

New PC designs may not reach a mass audience, but some features point to the future of computing. *By Galen Gruman*

MORE ►►►

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81



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Columns

THE EXCHANGE

Six Tips for Effective Career Development Programs | 44

Executive Council members share their tried-and-true methods for grooming their staff. *By Martha Heller*

MAKING I.T. WORK

Hiding Behind Certification | 51

An overreliance on IT sheepskins is a recipe for disaster.

By Michael Schrage

REALITY BYTES

Happy Employees, Happy Customers | 84

Bleeding-edge technology means nothing if employees aren't well-trained and well-cared for. *By Thomas Wailgum*

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IT chief at USAA exits; Cycling power; IBM offshoring sparks protests; Crossing the digital divide one person at a time; Selling Girl Scouts on science; *And more*

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Turnover is expensive.

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In San Jose, support for tech industry is way to victory.

ESSENTIAL TECHNOLOGY | 89

Today's CIOs depend on middleware more than ever. First-generation products were child's play compared to what the current technology can do. *By Lauren Gibbons Paul*



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Four technologies by Finnish firm MyOrigo could soon make accessing the Web from your cell phone easier and more user-friendly.

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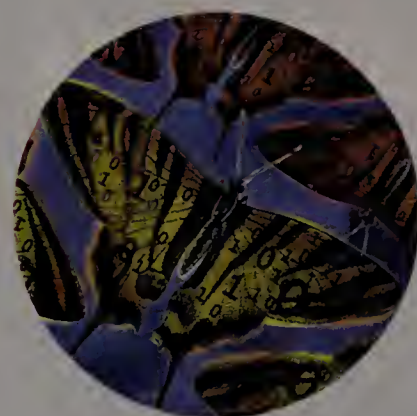
The mainframe soldiers on, but the clock is ticking on legacy apps.

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Recipe for Good Governance

MIT research has found that good IT governance leads to better return on assets for companies. But what makes for good governance? Here are the ingredients.

By Jeanne Ross and Peter Weill



In Every Issue

FROM THE EDITOR

My Lunch with the Elephant | 16

At CIO luncheons, somehow the conversation always comes around to that awkward topic: outsourcing. *By Richard Pastore*

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Abstracts of all the feature stories found in this issue.

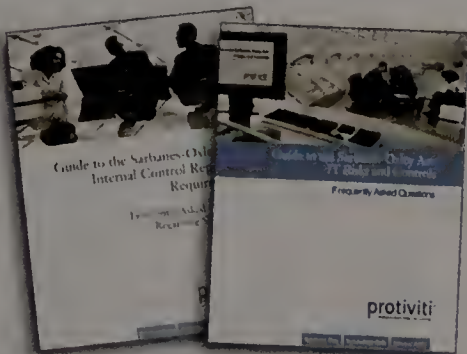
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A woman in an Egyptian costume, including a large, ornate headdress and a yellow and gold patterned dress, is shown in profile. She is standing in front of a film set background that includes a sign that says "STAGE 21" and a bright, out-of-focus light source. The overall scene is dimly lit, with the woman's costume and the background elements providing the main visual interest.

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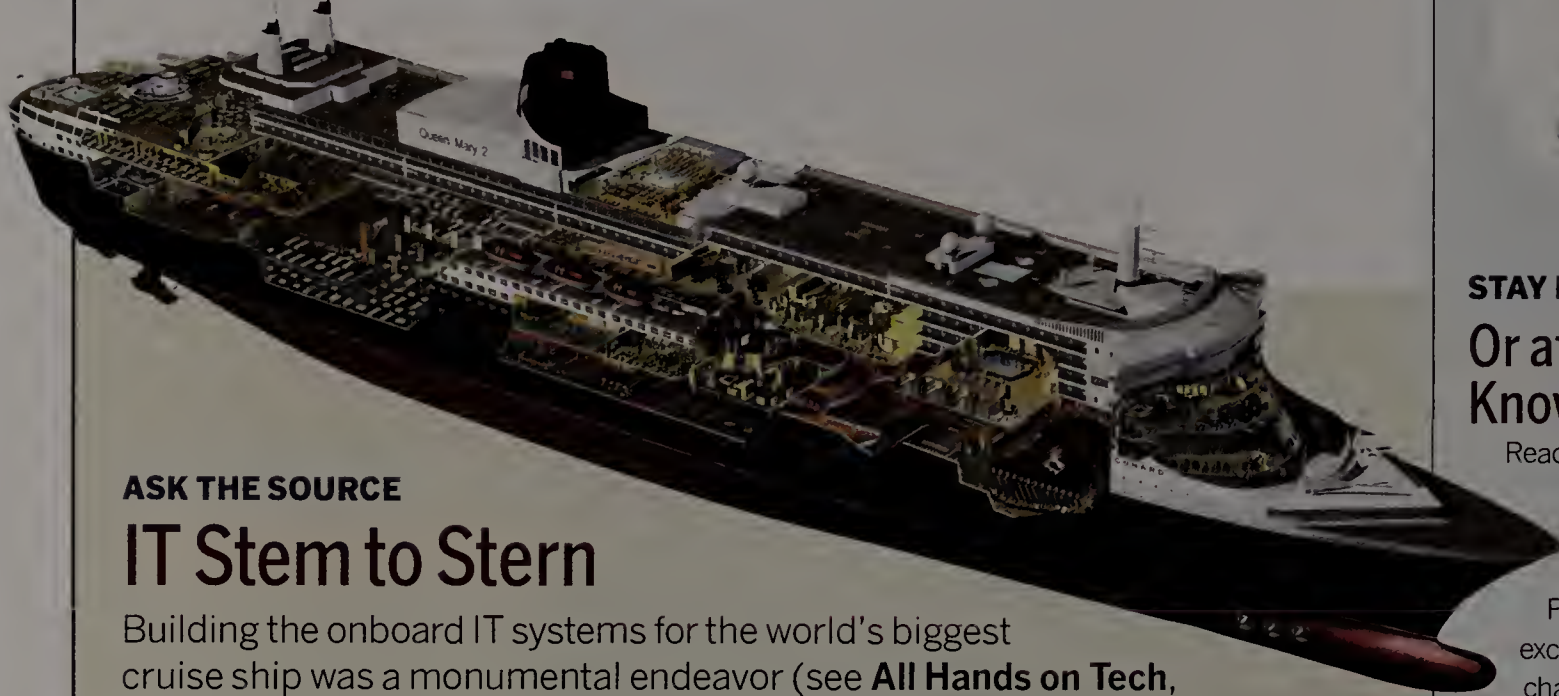


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ASK THE SOURCE

IT Stem to Stern

Building the onboard IT systems for the world's biggest cruise ship was a monumental endeavor (see **All Hands on Tech**, Page 72). Jeff Richman, director of business solutions and applications development for Cunard Line, and the rest of the 28-person IT crew developed and installed integrated front-end and back-end functions for the floating city that is the *Queen Mary 2*.

If your team is undertaking a, well, titanic makeover and you need advice, **ASK THE SOURCE**. Richman will be online through June 30. Go to www.cio.com/experts.

LEARN MORE

Is Demand Forecasting an Impossible Dream?

Roland Wolfram

In Nike's sprint for supply chain glory, the company suffered a sprained ankle or two (see **Nike Rebounds**, Page 56). But Nike's not the only one in pursuit of an exquisitely balanced forecasting system. Check out these recent stories on supply chain, inventory and demand forecasting—**How Levi's Got Its Jeans into Wal-Mart**, **Hot Potato** and **They Know What You'll Buy Next Summer (They Hope)**—at www.cio.com/printlinks.



STAY IN THE VANGUARD

Or at Least Know Where It Is

Reading Galen Gruman's update on the future of the PC (see **Four Concept Computers**, Page 81) may leave you excited (or anxious) about the changes ahead. To keep up with advances, developments and possibly the next big thing, subscribe to CIO's Emerging Technologies newsletter. We'll send you links to stories about what's new in the field and what's around the corner. To see a sample and subscribe to this free e-newsletter (or any one of 20 others), go to www.cio.com/newsletters.

ADD A COMMENT

► How Will Restrictions on Offshoring Affect You?

By the end of February, state legislatures had introduced 27 bills designed to restrict offshore outsourcing. In **Offshore Regulations: What to Worry About** (Page 64), writer Ben Worthen suggests these bills may be just the opening salvos in a battle that will only heat up. He outlines how CIOs can start preparing for the inevitable. How will you be affected? Go to the online version of this story, scroll down to the **ADD A COMMENT** box, and let us know.

► Fightin' Words

You expect anything less from Michael Schrage? In **Hiding Behind Certification** (Page 51), he tackles professional certification and accreditation, and the seemingly pathological need so many CIOs have for such validation of skills and organizational performance. How about you? Are you, as Schrage suspects, "either too busy or too lazy" to do your homework? Let him know what you have to say in the **ADD A COMMENT** box at the end of his column online.



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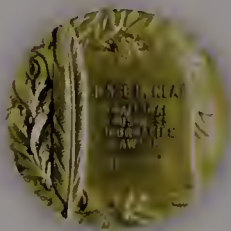
GOING BEYOND THE CALL.®



From the Editor



The topic of offshore outsourcing used to engender discussions about its economic benefits. Not anymore. The subject today is rife with controversy, political protest and economic doomsaying. To read more, see "USAA IT Chief Exits" (Page 22) and "IBM Offshoring Sparks Protest" (Page 24).



2004
GRAND
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For the second year in a row, *CIO* magazine has won the prestigious Jesse H. Neal National Business Journalism Award for editorial excellence

My Lunch with the Elephant

WHEN YOU JOIN A ROOM full of CIOs for lunch, as I did at our recent CIO Perspectives conference in Carlsbad, Calif., the discussion inevitably turns to outsourcing. You may start out talking about the sunny weather, the rabbits on the golf course or even something job-related such as managing IT globally. But, somehow, someone always brings up offshore outsourcing, and away the conversation goes.

I don't blame CIOs. Outsourcing is the elephant in the room. To not talk about it would be as awkward and disingenuous as watching *The Apprentice* without acknowledging the muffin growing out of Donald Trump's head.

What surprises me is that I'm hearing a persistent new thread in the lunchtime talk. In the not-too-distant past, the thrust was always the economic inevitability of offshore outsourcing. "We gotta take advantage of the labor rates. We'd be fools not to." And I still hear that as CIOs slice into their breaded chicken cutlets at the luncheon, glancing up between bites at the outsourcing elephant now lumbering toward our table.

But, today, I also hear that all this offshoring

could damage the entry-level ranks of our domestic IT staff. Will it be possible to develop the next generation of IT leaders when these IT-starter positions are moving offshore? Will college kids shun the profession, seeing little chance of breaking in?

When these questions arise, there is usually at least one CIO at the table who espouses the economic theorist view that, due to fundamental laws of supply and demand, these negative consequences could never happen. But there were more than a few in Carlsbad who believed that the elephant now looming over our shoulders cannot be predicted so easily, that it represents a potential danger to the U.S. IT profession as we know it.

State and federal legislators think that they can control the elephant, or at least win election-year votes by attempting to rein it in. These efforts are detailed in Senior Writer Ben Worthen's story, "Offshore Regulations: What to Worry About," on Page 64. Are you as worried as the Carlsbad CIOs? Or do you agree that there will always be plenty of good IT jobs for talented newcomers in this country? Drop me your thoughts at pastore@cio.com.

Richard Pastore, Deputy Editor
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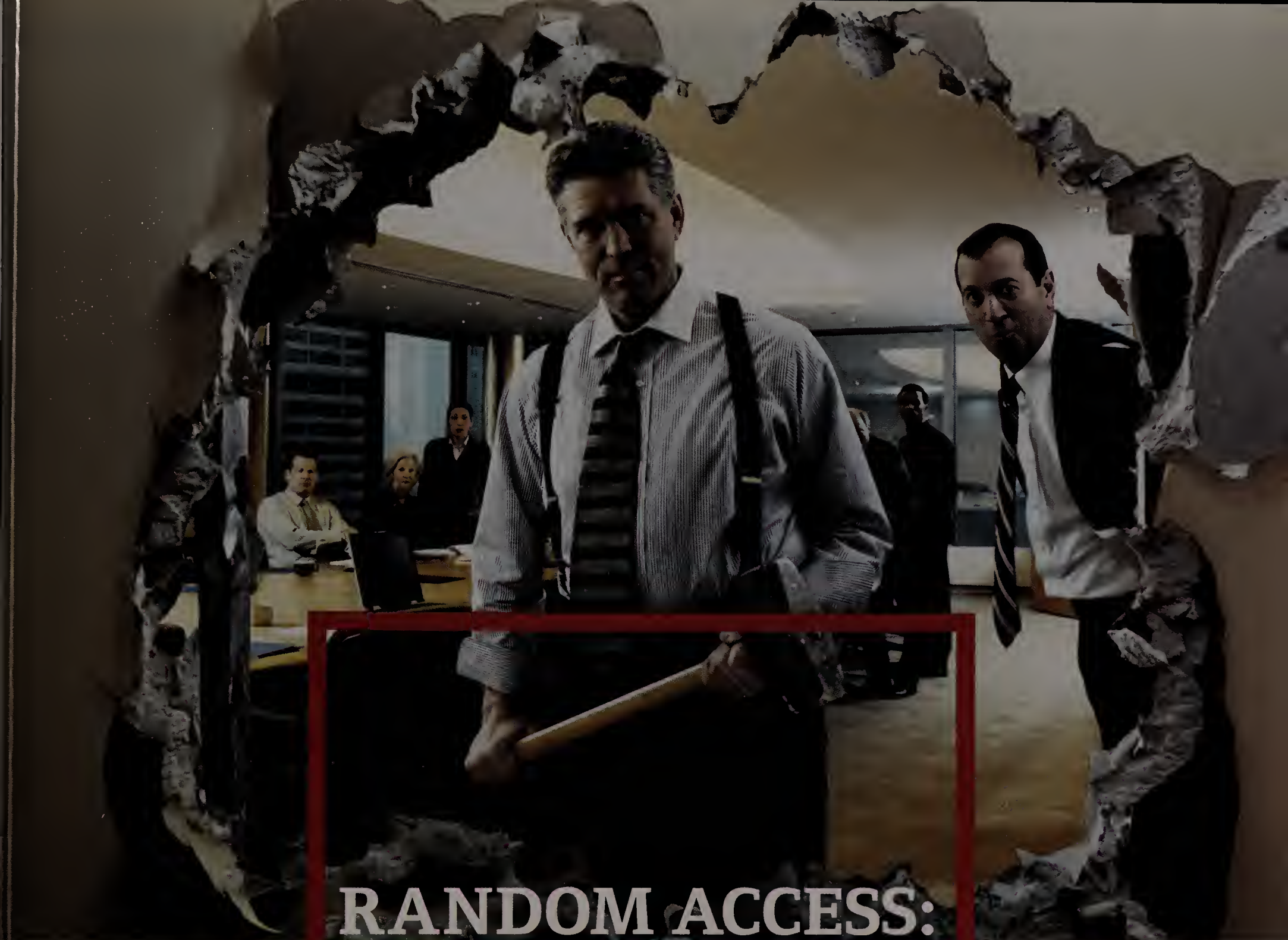
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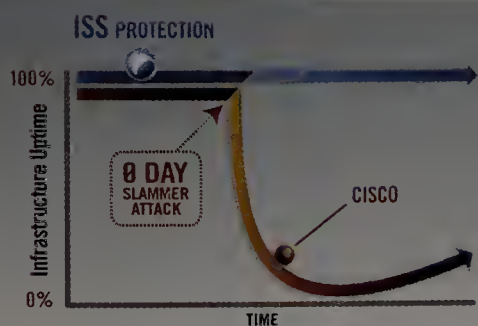
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I.T. MANAGEMENT

USAA IT Chief Exits

IT unit president Steve Yates leaves as offshoring controversy hits San Antonio

WHEN STEVE YATES was hired as CIO of USAA in mid-1999, the financial services company's IT expenses were rising twice as fast as its revenue. In less than five years, Yates transformed USAA's IT department into ITCO, a subsidiary with its own profit and loss lines. Over the past three

no longer works at the company. Greg Schwartz, senior vice president of enterprise solutions under Yates, will head up IT at USAA, according to spokeswoman Katie Spring. Attempts to reach Yates were unsuccessful. A former aide at USAA says he was going to spend time with his family.

The circumstances surrounding Yates' unexpected exit raise questions about whether Yates was caught in a controversy in his company's hometown about USAA's use of offshore IT contractors.

The local media in San Antonio, Texas, has started to draw attention to the IT work that USAA sends offshore, such as some of its application development. USAA is the city's largest employer and a community pillar—a local expressway is even named after the former CEO, Robert F. McDermott. Whatever happens at USAA is news in San Antonio, says Ramiro Cavazos, the city's director of economic development.

In 2001, USAA laid off 1,400 employees, including an unspecified number of IT workers. Around this time, USAA started outsourcing some of its IT work to India. In September 2003, *The San Antonio Express-News* reported that about 20 percent of Yates' ITCO employees—close to 500 workers—were from Tata Consultancy Services, the giant Indian outsourcing vendor. In February, San Antonio TV station WOAI ran a news report featuring former USAA employees who said they were replaced by workers from India.

Continued on Page 24

Top IT chief Steve Yates left USAA last month during a media firestorm over the company's outsourcing practices.

years, USAA's IT expenses dropped dramatically. Revenue skyrocketed.

That's why CIO prominently featured Yates and his USAA team in its May 1 special issue on "How to Run I.T. Like a Business" (see www.cio.com/printlinks).

Yet, less than two weeks later, Yates was gone from USAA. It was not immediately clear whether Yates was fired or had left on his own. After his departure on May 10, USAA would confirm only that Yates

METRICS

Cycling Power

LANCE ARMSTRONG

doesn't track his speed when he trains for next month's Tour de France. The number he craves is measured in watts, not miles per hour. Power output dominates the training of top cyclists like Armstrong because it's a much more accurate gauge of performance than speed (at the mercy of the wind) or even heart rate (too fickle), say experts.

Power never lies because it is a direct measure of the force applied to the bike (torque) that is converted into a measure of power output (watts). By measuring how many watts he expends on a mountain climb, Armstrong can develop a training program that duplicates those race efforts down to the watt. For the past seven years, Armstrong has used a \$2,600 device called the SRM Powermeter, developed by German medical engineer Ulrich Schoberer in the late 1980s. The Powermeter measures deflection of the pedal crankarm using tiny strain gauges and converts the measures into watts on a handlebar computer that can store and download 70 hours worth of wattage (and heart rate) for analysis—numbers that Armstrong pores over obsessively.

Armstrong sure can crank. During the final hour of a seven-hour stage of the Tour, he can pedal at an average of 400 watts. (Track racers have pushed it over 2,000 watts for a few seconds. The average cyclist can barely light a 100-watt lamp.) "Pro cyclists used to train according to how they felt," says David Cathcart, marketing director for CycleOps Performance Training Products, which makes a watt measurement device called Powertap. "Now it's all about metrics."

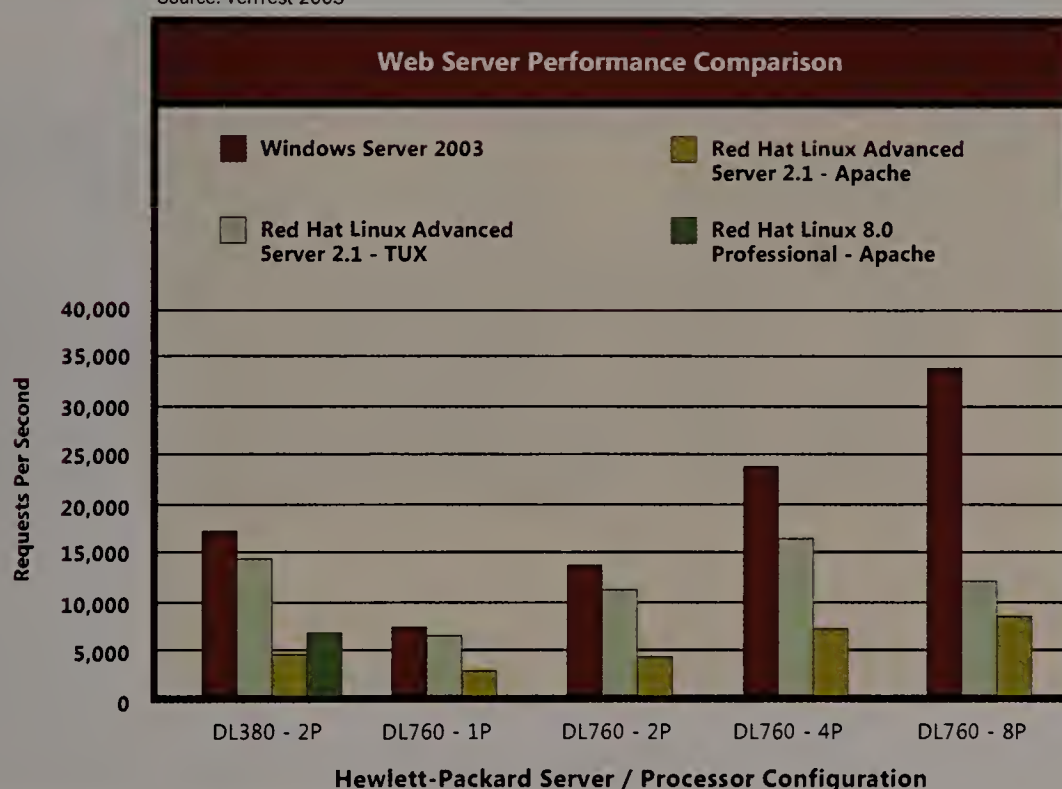
—Christopher Koch



World-class cyclists such as Tour de France champ Lance Armstrong use high-tech devices on their bicycles that measure power output.

WHICH OFFERS SUPERIOR PERFORMANCE: WINDOWS OR LINUX? THE RESULTS ARE IN.

Source: VeriTest 2003



The Windows platform generated up to 300 percent better peak Web serving performance compared to Linux according to a recent benchmark test conducted by VeriTest, a leading independent testing company. In fact, VeriTest found that Windows Server™ 2003 with Internet Information Server (IIS) 6.0 outperformed every Red Hat Linux configuration they tested, regardless of the server employed or the number of processors. To get the full study and more third-party findings, visit microsoft.com/getthefacts



OFFSHORE OUTSOURCING

IBM Offshoring Sparks Protests

ROUGHLY 2 DOZEN PICKETERS, current and former IBM workers raising signs that read "America's future is not offshore" and "Offshore CEO Sam Palmisano," alerted shareholders attending the company's annual meeting April 27 that offshore outsourcing would be on the table.

Inside the Rhode Island Convention Center in Providence, Sam Palmisano, IBM's chairman, president and CEO, defended the outsourcing strategy, which has gained a high profile after reports said executives discussed moving a large number of U.S.-based jobs to countries such as India.

Palmisano stressed IBM's strength as a global business and said it needs to "look at a global skills pool around the world." He

pointed to \$25 million the company has set aside for the Human Capital Alliance, a skills retraining program, although he acknowledged that the effort is just beginning.

However, it was apparent from the chairman's remarks extolling the benefits of open markets and global free trade that IBM is not turning back from offshoring. "Most people recognize that you can't lock down jobs, businesses and skills, and you can't lock down nations," Palmisano said. And he warned that in managing an enterprise such as IBM, there can be "no emotional attachment to the things that don't represent your future."

That lack of emotional attachment, to employees in particular, rankles with long-time IBMers who say they have seen a shift

in the corporate culture.

Bill Costine, an IBM AIX system support employee in Fishkill, N.Y., took part in the demonstration in front of the convention center. Costine says that he feels his job is relatively safe for now because it requires face-to-face interaction with U.S.-based hardware engineers. But others are vulnerable. "Any help desk job, any programming job, any software development job, anything that doesn't involve face-to-face transactions with your customer" is vulnerable, he says.

—Elizabeth Heichler

Current and former IBM workers held signs protesting the company's offshore outsourcing practices outside its annual meeting in April.



IT Chief at USAA Exits

Continued from Page 22

The broadcast included a video of USAA CEO Bob Davis citing the superiority of offshore IT talent. "We do [outsourcing] because it helps us get our projects done, and because the level of expertise of this technology, these technology companies and individuals is incredible," Davis says on the tape. "I mean, if we could get this same thing in the United States, we'd do it. It's not available. It's not here. It just doesn't exist."

In the same broadcast report, Yates responded on camera to former workers' complaints that USAA had replaced Americans with foreigners by saying, "I can see where you could draw that conclusion. That wasn't the intent. If we've gotten there, we kind of backed into it."

The story, picked up by the local news-

paper, caused a stir in San Antonio. On April 26, USAA filed suit in Bexar County District Court against the TV reporter who aired the story, Tanji Patton, and WOAI owner Clear Channel Communications. The lawsuit claims that the video and other USAA documents used in the report are trade secrets, and that Patton obtained them from unnamed sources without the company's consent. Yates is not named in any of the court documents filed as of May 13. Officials for both WOAI and Clear Channel declined to comment on the case.

Yates' departure from USAA is surprising, says Phil Schneidermeyer, a CIO recruiter for Highland Partners, because he excelled at a rare kind of job—an IT executive who leads an entire business organization. "I would have assumed [Yates] would be at USAA forever. At least until he resigned," Schneidermeyer says.

While it is not clear if the media reports

caused Yates to leave USAA, Schneidermeyer says it can be "a very risky thing" for executives to talk publicly about controversial issues. "It doesn't get any riskier at this moment in time than talking about offshore outsourcing," he adds. (For insights into government rules on offshore outsourcing, see "Offshore Regulations: What to Worry About," Page 64.)

Whether or not Yates left voluntarily, his prospects for another IT leadership position are quite good. "More companies are running their IT organizations like a business. And those CIOs that have taken it to the next level, wherein it is actually a P&L, have been and continue to be in demand," says Schneidermeyer, who previously placed Yates as Rockwell Automation's CIO. "[Yates] had quite a run at USAA and Rockwell. He is one of the few who really do run IT like a business."

—Ben Worthen and Stephanie Overby

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By the Numbers

By Jon Surmacz

Turnover Is Expensive

Turnover will cost you. How much depends on the value you put on your employees.

IT'S BEEN AWHILE since CIOs have had to worry about staff turnover. But as the economy picks up, it stands to reason that companies will ramp up hiring efforts and try to lure away your best performers. According to Forrester Research, it can be much cheaper to start doling out pay raises and other rewards now rather than wait until staffers leave. The cost of turnover, says Craig Symons, a principal analyst at Forrester, has two major components: hiring costs and vacancy costs. Hiring costs are the hard costs associated with recruiting a new employee (advertising fees, and costs for screening, interviewing and processing candidates). Vacancy costs include

the less obvious (but very real) costs of replacing the former employee (compensation for interim replacement or overtime for work assumed by current staff, productivity losses, and loss of knowledge of unfinished projects and institutional business knowledge). According to a Forrester estimate, the average cost to hire ranges from 25 percent to 100 percent of a worker's annual salary (this estimate does not include vacancy costs). In other words, if a midlevel IT manager who earns \$75,000 in annual salary decides to leave, it could cost anywhere from \$18,750 to \$75,000 to hire a replacement. Those figures will vary, says Symons, based on the

Best Practices

Have a good training and development program in place. "The best retention vehicle is investing in your people," says Craig Symons, a principal analyst at Forrester Research.

Identify your key people and spend time and attention on them. They will create the biggest problems if they leave.

Don't underestimate the value of noncash rewards. At the end of the day, says Symons, people would rather have a dollar in their pocket. However, publicly recognizing employees for hard work has value. And it's cheap too.

type of job and the skills required for it, the tenure of the former employee and corporate HR policies on hiring. However, the message is clear: Turnover is expensive.

The Cost of Replacing Mr. Out-the-Door

Here's how your company might spend \$75K to fill an IT vacancy



SOURCE: Forrester Research

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GRASSROOTS TECHNOLOGY

Crossing the Digital Divide, One Person at a Time

SAN PABLO, CALIF. — In this rough town north of Oakland, Randal Strickland is using technology to make a difference in people's lives after seeing it transform his own. The vehicle is Street Tech, one in a network of Community Technology Centers (CTCs) around the nation that work at the grass roots to build citizens' technical skills and computer literacy.

Strickland, a heavily muscled man who spent a decade behind bars, is one of the stars of the San Pablo center. He's an ex-con who came through its technology training programs, worked for large corporations Chevron and Levi Strauss, and is now Street Tech's full-time technical programs coordinator.

There are thousands of CTCs in the United States, all nonprofits, all designed to help bridge the digital divide by teach-

ing low-income people technology skills. "We're trying to get the hardest-to-serve, most difficult populations," says Paul Lamb, Street Tech's founder and executive director.

To that end, Street Tech runs a basic three-month class designed to demystify PCs for people who may have never turned one on (part of the class involves refurbishing PCs). But it also offers classes to help people get a CompTIA A+ certification, as well as Microsoft Certified Professional courses; and it teaches professional skills workshops, since few of its students have ever held white-collar jobs. It has graduated between 60 and 100 students a year since its founding in 2000. Even in the pallid Bay Area economy, 60 percent of those seeking jobs found them, and 30 percent have returned for additional training.

Street Tech is one of the larger CTCs, with four full-time employees and 10 part-time (including Lamb). It's also one of the most creative. In January, it opened ReliaTech, a storefront service center for PC repairs. It shares space with a San Pablo Public Library branch, a center to help people assess skills and find jobs, a child-care center and a couple of small retailers.

While Lamb jokes that ReliaTech's ambition is to bury retail chains like CompUSA, its real goals are to provide work experience for Street Tech course graduates and generate a profit that will help reduce Street Tech's need for grants. (The center's \$500,000 budget comes mostly from foundations.) ReliaTech employs eight people, including CEO Jessy Gonzalez, a former technology consultant who was Street Tech's first technical training director. One of its technical leads is a former auto mechanic named Patrick Cheung, who now works for the Bay Area School Districts. Cheung has developed a passion for technology through taking Street Tech courses and, in less than two years, has become a Microsoft-certified service administrator.

Paul Lamb leads a community technology center that trains citizens in computer literacy and PC repair.



Randal Strickland, program coordinator, says the San Pablo technology center has a great impact on people's lives.

Lamb and Gonzalez were scheduled to talk about ReliaTech at the annual conference of the CTC Network in Seattle, happening June 11–13. The program's potential might spark new ways of doing things for CTCs in other parts of the country. "I'm very excited to watch Paul. When he is successful, we'll be able to model that for other CTCs," says Kavita Singh, executive director of the Community Technology Centers' Network, an umbrella group in Washington.

There are successes to share. Strickland recalls being told that no one in the high-tech world would hire a former felon, and that he should pursue construction work. After he got a minimum-wage job in a small store repairing PCs, he thought the best he could hope for was getting a similar job at a chain retailer like Best Buy. Coming to Street Tech, he says, elevated his hopes and "rekindled that desire" for his work to be meaningful.

"We have this great impact," he says. "We're putting people to work and bringing technology to the streets, and creating a social impact." —Michael Fitzgerald

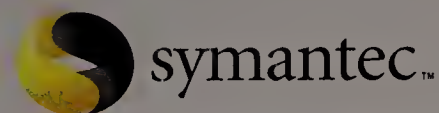




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Washington Watch

Edited by Elana Varon

In San Jose, Support for Tech Industry Is Way to Victory

Voters likely to stick with incumbent Lofgren, a top voice on IT policy

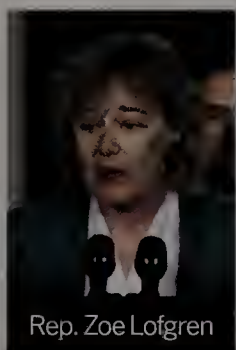
IN SILICON VALLEY, where technology dominates the economy and politics, Democratic Rep. Zoe Lofgren has a huge advantage in money and voter support. Historically Democratic candidates are popular in her San Jose district, and Lofgren has cemented her chances by helping advance the agenda of the high-tech industry, says Sherry Bebitch Jeffe, a political analyst at the University of Southern California.

"She's a Democratic incumbent in a district where there are contributors who can easily write checks for thousands of dollars," Jeffe adds. "It's to me a slam dunk."

Lofgren, first elected in 1994, faces token opposition from two challengers with IT in their backgrounds. The Republican is Douglas McNea, who she trounced in 2002 with 67 percent of the vote. McNea, a nuclear scientist and Microsoft-certified systems engineer, is running again because he believes Lofgren isn't looking out for technology workers. Libertarian Markus Welch, an IT manager, is running for the first time and has not campaigned widely.

Lofgren has won high marks from the tech industry, whose side she has taken in favor of importing workers, exporting IT products and opposing elimination of stock options.

As of March 31, Lofgren had raised more than \$276,000 for the 2004 campaign, according to OpenSecrets.org, thousands more than McNea. Welch did not report his campaign contributions. People in the IT industry are collectively Lofgren's biggest donors, giving her more than \$31,000 for this year's race. Among her top sources are the National Venture Capital Association, providing \$8,500, and Siebel



Rep. Zoe Lofgren



Douglas McNea

Systems, donating \$5,000. Lofgren won an award from the Business Software Alliance in 1999 for her success at lifting export restrictions on American encryption products. The group later opposed her bill spelling out the types of

copies consumers could make of copyrighted digital content, and the measure went nowhere. It turns out that tech companies value Lofgren's accessibility as much as her positions.

Lofgren has taken some unconventional stands. She was one of only five House members to oppose the Can-Spam Act (an antispyam bill) last year, saying it wouldn't be effective. Lofgren says she would consider legislation encouraging corporate CEOs to pay more attention to cybersecurity, a position few legislators discuss openly.

Recently, Lofgren has reversed one controversial position: her push in 2000 to increase the number of foreign tech workers allowed into the United States on H-1B visas. Lofgren says she opposes another increase "given the number of engineers who are unemployed."

Republican McNea observes that Santa Clara County has lost about 200,000 jobs since the dotcom bust and Lofgren hasn't done enough to fix the problem. He would reform visa programs, but doesn't offer specifics other than to say, as does Lofgren, that the number of visas shouldn't be increased again.

McNea, who works for a nuclear power consultancy, calls for the adoption of new nuclear power technologies. Energy issues should be important to technology companies that are big users, he says.

—Grant Gross

RFID Laws on Deck

Push to limit data use

WITH WIDESPREAD ADOPTION of radio frequency identification (RFID) tags under way, privacy advocates are pushing for regulations on these tiny computer chips that can track information about the products they are attached to.

Several government agencies and large companies intend to use RFID tags in force by 2005. The Department of Defense is planning to require its suppliers to attach RFID tags to their shipments, as are Wal-Mart and rival Target. A recent CIO survey found that 17 percent of respondents have deployed the technology.

That means this year provides the last chance for privacy advocates to set limits for how RFID can be used before it hits the mainstream, when regulating it will become more difficult. In at least three states, legislators have introduced bills to limit RFID use, such as requiring companies to remove RFID tags from products once they are purchased.

David Peyton, director of technology policy for the National Association of Manufacturers, says such legislation is moot because companies are only using the tags to track products through their supply chains.

That assurance isn't enough for Sen. Patrick Leahy (D-Vt.), the Senate's most vocal civil liberties watchdog. Leahy worries about companies eventually treading on customer privacy the way Wal-Mart did when it let researchers observe consumers who picked up tagged Max Factor lipsticks. Leahy wants hearings on RFID, though his spokesman David Carle says they will not take place this year.

—Ben Worthen

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Opening Address:

Jeffrey Garten,

Dean of the Yale School of Management, Author & Business Week Columnist on the major economic issues and trends impacting business and technology.

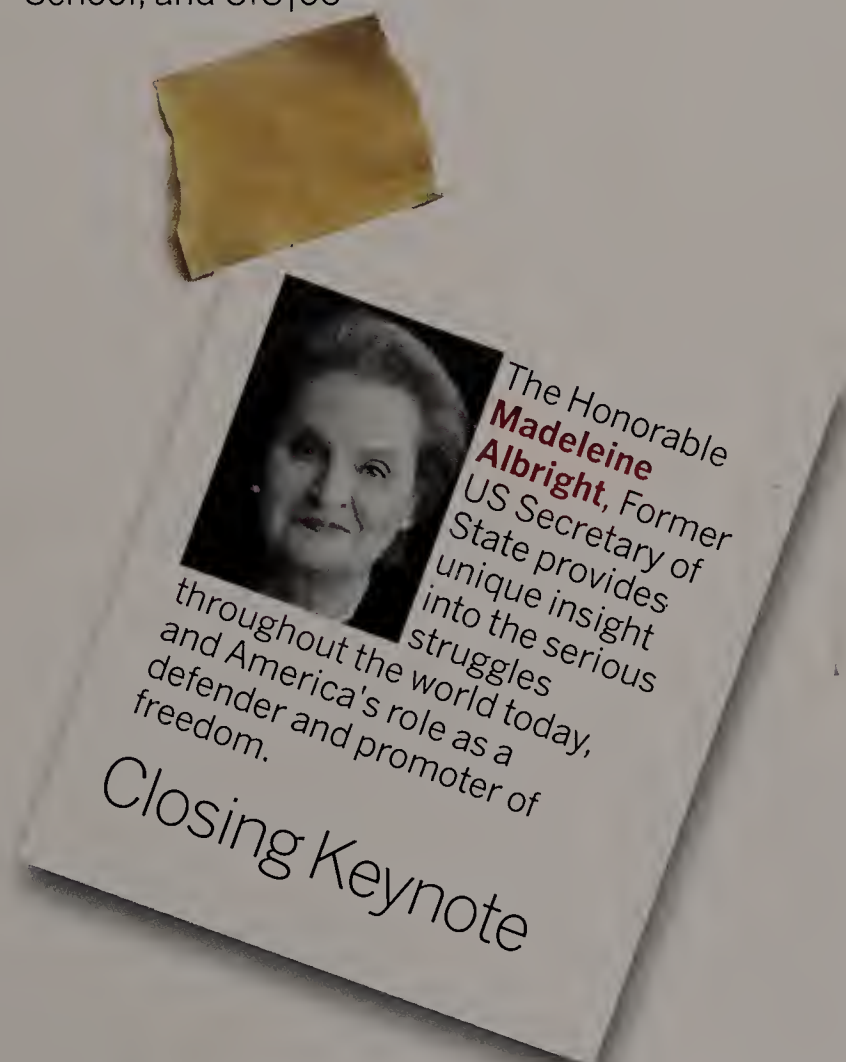
Conference Moderator

Jonathan Zittrain

Co-Founder, Berkman Center for Internet & Society, Harvard Law School, and CIO|05

Special Address on the CEO/CIO Relationship:

From The Campbell Soup Company, CEO **Douglas Conant** and CIO **Doreen Wright** discuss the special nature of the CEO/CIO relationship and how they each work to keep it strong.



E D U C A T I O N

Selling Girl Scouts on Science



WOMEN MAKE UP 46 percent of the U.S. workforce, but only 22 percent of scientists and engineers, according to the National Science Foundation. The Girl Scouts are working with corporate and government agencies to change that.

"There has always been an interest at the Girl Scouts in making sure that girls have good skills and abilities, and technology is what girls need to understand," says Marcia Balestrino, CIO of the Girl Scouts of the USA, which has 315 local councils.

Balestrino says that girls are interested in technology, but they use it differently than boys do. A 1998 book studied by the Girl Scouts (*Girl Games and Technological Desire* by Cornelia Brunner, Dorothy Bennett and Margaret Honey) notes that while boys look online for entertainment, girls spend more of their online time socializing.

Lockheed Martin, Lucent Technologies, Intel and NASA distribute educational materials and career information on topics such as archaeology, meteorology, engineering and design to the local Girl Scout groups.

"By the time they're 11 or 12, girls go away from [science and technology] being a career. Girls think of [people with] technology careers as nerds with pocket protectors," says Balestrino, who is a former Girl Scout. "Part of the initiative is to let girls know that there are all kinds of things they can do with a technology career."

Girl Scouts can earn technology-related badges, including the Point, Click, Go badge, for learning how to use the Internet, as well as more advanced badges for doing project-related Internet searches.

This is important, Balestrino says. A 2002 survey conducted by the Girl Scouts found that parents often dictate rules for online safety (no online chatting or romance, for example). So girls need positive encouragement on using the Internet safely.

"Girls aren't given a lot of information on how to use the Internet," says Balestrino. "Most of it is how *not* to use it." —Thomas Wailgum

T E L E C O M M U N I C A T I O N S

China Shuts Down VoIP Vendor

A MAN SUSPECTED of managing an illegal voice-over-IP (VoIP) telephone service in China faces a prison sentence of at least five years if convicted, according to a *China Daily* report.

The man, identified only by his surname (Zou) and hometown of Qingdao in eastern China, was arrested in March this year after police and telecommunications officials found a number of facilities, including an illegal Internet gateway, according to the Beijing-based newspaper. The police investigation apparently began in February when Zou's company was advertising his cheaper call service to foreign companies.

Zou's business allegedly took in \$360,000 in VoIP business, according to local police. That represents a loss of around \$1 million in revenue to state telephone companies when measured at their higher call rates, according to the newspaper.

—Martyn Williams

W I R E L E S S A P P L I C A T I O N S

Legoland Tags Kids for Safety

YOU'VE HEARD public address announcements at public arenas asking parents of lost children to come and pick them up. The Legoland amusement park in Billund, Denmark, is using radio frequency identification (RFID) tags to bring direct communications to that process.

At its season-opening day in March, the park launched a new child-tracking system that combines RFID tags and Wi-Fi technology, according to a recent report in *Network World*. Visiting parents with cell phones and text-messaging capabilities can rent wireless-enabled wristbands for their kids, and then track the children to within about five feet of their location if they become separated.

At Legoland, Wi-Fi access points and location receivers scattered throughout the 2.5 million-square-foot park are set to receive Wi-Fi-compatible messages. The access points and receivers pick up Wi-Fi messages from the RFID tags (from a vendor called Bluesoft) and use triangulation to determine where a particular tag is located. Now the whole park doesn't have to hear that your kid is missing.



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New Ideas from Leading Lights

Recipe for Good Governance

MIT research has concluded that good IT governance leads to better return on assets for companies. But what makes for good governance? Here are the ingredients.

COMPANIES WITH BETTER THAN AVERAGE IT governance earn at least a 20 percent higher return on assets than organizations with weaker governance. Why is this?

Just as corporate governance is critical for ensuring that key decisions are consistent with corporate vision, values and strategy, IT governance is critical for ensuring that IT-related decisions match companywide objectives. Simply put, good IT governance makes companies more successful by establishing coordinated mechanisms that link objectives to measurable goals.

So what constitutes good governance? We've been studying that question for the past three years, with more than 250 organizations in 23 countries. But before we share our findings, let's define what we mean by IT governance: It is the decision rights and accountability framework for encouraging desirable behavior in the use of IT. Companies make five types of IT decisions:

1. IT principles decisions dictating the role of IT in the enterprise
2. IT architecture decisions on technical choices and directions
3. IT infrastructure decisions on the delivery of shared IT services
4. Business application requirements decisions for each project
5. IT investment and prioritization decisions



The Elements of Governance

Companies design governance mechanisms to make and then implement each of these decisions. There are many types of governance mechanisms and techniques. For clarity, we group them into three categories based on what they accomplish—mechanisms that facilitate decision making, processes that ensure alignment between technology and business goals, and methods for communicating governance principles and decisions. “Effective IT Governance Mechanisms” (on Page 38) lists common IT governance mechanisms in these three categories used by the majority of the 256 chief information officers we surveyed. The numbers associated with each mechanism represent the CIOs’ rating of that mechanism’s effectiveness in ensuring good governance. Judging by these effectiveness ratings, you can determine (on average) the likely success of each mechanism.

ILLUSTRATION BY RYAN HASCHKA



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Keynote

But we must note that any of these techniques can contribute to effective governance if they are implemented well. Those with relatively low effectiveness scores were generally rated that way because CIOs found them harder to implement. For example, tracking the business value of IT is tougher than tracking IT project resources. But we have found that tracking the business value of IT can generate significant benefits. It just

Effective IT Governance Mechanisms

These common IT governance mechanisms are used by the majority of the 256 companies surveyed by MIT. The associated numbers represent the CIOs' rating of that mechanism's relative effectiveness in ensuring good governance.

GOVERNANCE MECHANISM	Rating: 1-5 1 (ineffective) to 5 (highly effective)
DECISION-MAKING STRUCTURES	
Business/IT relationship managers	3.9
IT leadership committee comprising IT executives	3.8
IT council comprising business and IT executives	3.7
Executive or senior management committee	3.5
Process teams with IT members	3.4
Architecture committee	3.1
Capital approval committee	3.1
ALIGNMENT PROCESSES	
Tracking of IT projects and resources consumed	3.4
Service-level agreements	3.2
Formally tracking business value of IT	2.9
Chargeback arrangements	2.8
COMMUNICATION APPROACHES	
Office of CIO or officer of IT governance	3.6
Work with managers when they fail to follow the rules	3.2
Announcements from senior management	2.9
Web-based portals and intranets for IT	2.9

takes practice; early efforts are often frustrating. Likewise, architecture committees can be difficult to implement well. These committees often have responsibility for limiting developers' choices and can easily become mired in insignificant battles that create bottlenecks in technology implementations. However, companies that persevere with architecture committees often find their efforts can improve cost, reliability and time-to-market.

Strength in Numbers

Individual governance mechanisms, no matter how well they are implemented, cannot alone promise effective IT governance. Top performing companies rely on a set of governance techniques that are simple, reinforcing, coherent and explainable, and that engage key decision-makers.

UPS, for example, has designed a coherent set of governance mechanisms. The company relies on its IT steering committee, a team of three senior executives (including the CIO), to establish IT principles, such as UPS's commitment to standardization and scalability in any system that touches its 60,000 drivers. This principle ensures reliability, cost-effectiveness, consistent customer service and easy access for customers to their package data. An IT governance committee—a small team of IT executives headed by the CIO—follows the mandates of the IT steering committee in making key architecture decisions. But the IT governance committee represents only one step in the debates around technology standards. The top IT architect—a CIO report and a member of the governance committee—heads a standards committee of key

Top performing companies rely on a set of governance techniques that are simple, reinforcing, coherent and explainable, and that engage key decision-makers.

technologists who determine when a standard has become obsolete or cannot meet the requirements of a specific application. This committee handles most of the daily negotiations around standards, but it escalates decisions up to the IT governance committee when members believe a standards decision has implications beyond the application in question. Similarly, in cases where the IT governance committee believes a standards decision will have long-term strategic implications for the enterprise, the CIO can escalate the decision to the IT steering committee. The objective is to gain the benefits of standardization without stifling business opportunities.

Road Map to Good Governance

From our research with top performing organizations such as UPS, we've gleaned the following principles of effective design and implementation of IT:

Limit the number of decision-making structures. Although all organizations want IT decisions to represent the interests of their varied stakeholders, the best companies assign clear responsibilities for each type of IT decision to individuals who



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can accept accountability for the outcomes of those decisions.

State Street has vested IT decision-making responsibilities with a small number of executives. The key decision-making body for IT principles and for investment and prioritization decisions is the IT executive committee (ITEC). Comprising the COO, the CAO, the CIO and senior executives from State

Street, top governance performers had more direct involvement by senior managers other than the CIO. The more involvement, the better the governance performance. “The Decision-Makers” (this page) lists managers in approximate order of their impact on governance when they join the CIO in

In our study, top governance performers had more direct involvement by senior management. The more involvement, the better the governance performance.

Street’s various business units, ITEC clarifies IT objectives, establishes the annual enterprisewide IT budget, and negotiates the approved list of projects and IT infrastructure initiatives. ITEC relies on the IT leadership group, which consists of senior business unit and corporate IT managers, to convert its principles and investment decisions into infrastructure services. The IT leadership group is also responsible for architecture decisions.

While State Street limits high-level IT decisions to a small group of accountable executives, the company uses alignment processes and communication approaches (such as those listed in “Effective IT Governance Mechanisms” on Page 38) to engage people up and down the ranks of the organization. State Street uses service-level agreements, chargeback, project-resource and business-value tracking, an enterprisewide budget process, and senior management announcements to clarify desirable behavior and individual responsibility for IT management and use.

Create overlapping responsibilities for IT decisions. The five types of IT decisions listed at the beginning of this column are interrelated, so while responsibility for making these different decisions might be distributed across the enterprise, companies need to ensure cross-coordination. Top performers in our study often rely on overlapping membership in their decision-making bodies. At Campbell Soup, the CIO sits on the executive committee that sets the company’s strategic direction. She also heads an IT leadership team responsible for IT principles that establishes mandates for Campbell’s IT architecture and infrastructure. In turn, Campbell’s architecture review board is headed by a member of this IT leadership team. The architecture review board works with the company’s project management office, as well as program review and compliance teams, to ensure projects conform to architectural standards and meet business objectives. These overlapping memberships coordinate decisions throughout the enterprise so that the strategic objectives filter down to decisions made on individual projects.

Involve senior management in major IT decisions. Senior man-

agement establishes strategic direction, and thus defines desirable behavior for the management and use of IT. Top management involvement is such an old chestnut that we often forget how important it is. If senior management is not involved in IT decision making, the organization is likely to experience a disconnect between business objectives and IT capabilities. In our

study, top governance performers had more direct involvement by senior managers other than the CIO. The more involvement, the better the governance performance. “The Decision-Makers” (this page) lists managers in approximate order of their impact on governance when they join the CIO in

The Decision-Makers

When they participate with the CIO in IT governance, other CXOs exert varying degrees of impact on IT decision making. The CEO is the real heavyweight, with more than twice the impact compared to the CIO alone.

Chief Executive Officer	2.1
Chief Operating Officer	1.7
Business Unit Leader	1.6
Business Unit Chief Information Officer	1.3
Chief Financial Officer	1.2
Corporate Chief Information Officer	1.0

agement establishes strategic direction, and thus defines desirable behavior for the management and use of IT. Top management involvement is such an old chestnut that we often forget how important it is. If senior management is not involved in IT decision making, the organization is likely to experience a disconnect between business objectives and IT capabilities. In our study, top governance performers had more direct involvement by senior managers other than the CIO. The more involvement, the better the governance performance. “The Decision-Makers” (this page) lists managers in approximate order of their impact on governance when they join the CIO in

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cost, reliability, speed and accessibility.

The CIO worked with the other C-level managers to take ongoing governance responsibility for principles, architecture, infrastructure and investment decisions. For example, an important mechanism involving the CXO team was a global IT portfolio management process to coordinate and align IT investments with Unicef objectives. Through the leadership of these CXOs, IT has fundamentally transformed the way Unicef operates and has improved global knowledge, information

changes should be rare. Once a company has designed a coherent set of mechanisms, governance can remain intact until a change in strategic direction redefines desirable behaviors.

For example, when J.P. Morgan Chase decided to seek synergies across its business units, management instituted governance structures to encourage the use of standardized technologies. With those mechanisms in place, the enterprise may occasionally tweak membership in decision-making structures, or enhance alignment processes or communication approaches. However, the basic set of governance mechanisms should be long-lasting.

Nearly half of the managers in the top 50 percent of governance performers could describe IT governance, while fewer than 30 percent of the managers could do so in the poorer performers.

flow, transparency and communication. Field offices can serve their constituents based on transaction-level and value-added information they could not access only a few years ago.

Design exception processes into governance processes. Technology, data and business process standards can help enterprises reduce IT and business process costs, increase systems reliability and enhance security. But allowing for exceptions to technology and business process standards is just as important as establishing and enforcing standards. Governance exception processes give individuals an audience when they feel that standards are limiting business success. More important, by revealing when standards are inappropriate or out of date, exceptions create learning opportunities. In our study, organizations with effective governance had fewer renegade exceptions, but more exceptions approved through a formal exception process.

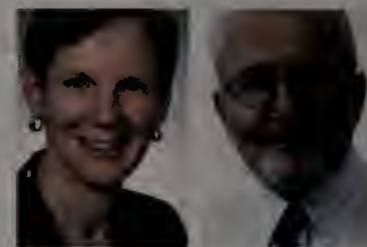
Companies have different needs for exceptions. MeadWestvaco, a global paper manufacturer, allows few exceptions to technology standards because it is pursuing a strategy of operational excellence. Operating at low cost means adopting and complying with standards. Accordingly, the CIO handles exception requests. UPS, in contrast, expects to innovate through IT. UPS's layered exception process, described earlier, helps the business recognize opportunities for new technologies.

Change governance only when desirable behaviors change. The process of changing governance, communicating the changes and then institutionalizing the new approach is lengthy. Governance takes six months or longer to implement, according to our study. Top performers changed their governance on average less than once a year, and their intent was to do so even less frequently. Poorer performing organizations changed their governance method as much as three times a year. Because organizations need time to learn new governance mechanisms,

percentage of managers who could describe governance, the higher the governance performance. When more managers can accurately describe governance, it is more likely to be part of the enterprise's management culture, and thus more likely to be followed—or better still, challenged and improved. Without an awareness of IT governance, there is no chance that it will be followed. Nearly half of all of the managers in the top 50 percent of governance performers could accurately describe their IT governance, while fewer than 30 percent of the managers could do so in the poorer performers. Proactively designing governance and then educating everyone in the enterprise as to how governance decisions are made reduces the mystery of IT and enables managers throughout the organization to accept responsibility for its effective use as a strategic asset.

While some companies fritter away their IT investments on tactical improvements, others target IT dollars on fulfilling strategic objectives. Not surprising, companies that use IT strategically demonstrate stronger financial performance. But strategic use of IT is possible only when companies design and communicate IT decision-making parameters and mechanisms. At the bare minimum, IT governance frees up the scarcest resource—management attention for the decisions that matter most. **CIO**

Jeanne Ross, principal research scientist at MIT Sloan School's Center for Information Systems Research (CISR), can be reached at jross@mit.edu. Peter Weill, CISR's director and a senior research scientist at the Sloan School, can be contacted at pweill@mit.edu. For more information see *IT Governance: How Top Performers Manage IT Decision Rights for Superior Results*, by Peter Weill and Jeanne Ross, Harvard Business School Press, May 2004.





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By Martha Heller, Director, CIO Executive Council

WORDS OF WISDOM FROM THE CIO EXECUTIVE COUNCIL

TOP of MIND

THE COMMUNITY HAS BEEN JAWING ABOUT...

Proving IT value:

To many senior executives, IT is still a "black box"

IT cost benchmarking:

In the end, the numbers tell you very little

Skill-sets for the future:

Our outdated staffing model won't get us where we need to go

Bandwidth:

Getting pricier by the minute

YESTERDAY'S NEWS

The "Does IT Matter?" debate

Editor's Note: The CIO Executive Council is a professional organization for CIOs. Its mission is to leverage the strengths of a large coalition of CIOs for the purpose of achieving change within our organizations and shaping the framework for the future of IT. For more information about the Council, contact Martha Heller at mheller@cio.com.

Six Tips for Effective Career Development Programs

Executive Council members share their tried-and-true methods for grooming their staff

IF WE'VE SAID IT ONCE, WE'VE SAID IT A THOUSAND TIMES: Your people are your greatest asset, and you need to develop them with as much care as you would your systems and products. Yet, career development programs are often given short shrift by senior executives with deadlines and budgets on their minds.

Members of the CIO Executive Council, a professional organization of CIOs founded by *CIO* magazine, told us about their career development programs and what makes them work. Here are some guidelines for getting the most out of your human investments.

1 WALK THE HALLS. Senior management meetings are not the right place to glean the career aspirations of your staff. "My organization is five deep. If I waited for the chain of command, I would never get the information I do by just asking people about their careers," says Samantra Sengupta, CIO of the Scotts Co. "I walk the halls a lot and sit down with people at all levels to understand their needs and desires." Based in part on staff feedback, Sengupta decided to split what was solely a managerial career path into three separate paths: traditional management, heavy technical competency with light management and architecture with no management responsibilities. The

paths carry similar compensation plans but allow each person to do what he does best. Before you walk the halls, make sure you clearly understand how much flexibility HR will allow when setting up a new career development program, cautions Sengupta. "If you encourage people on your staff to give you a data dump about their career, they may believe that you will act on their wishes," he says. "You have to know what you can and cannot do before you initiate the discussion."

2 CREATE AN INTEGRATED JOB MODEL. When Jim Burdiss became CIO of Smurfit-Stone in January 2002, there were few titles on his staff other than "systems analyst." So he

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put Keith Fehd, director of applications development and support, in charge of developing a program that would define paths for progression along four distinct disciplines: applications, infrastructure, business operations and management. "The program is successful because it integrates job titles with salaries, skill requirements, merit increases and our annual review process," says Burdiss. "We now have a much clearer view into the skills of our organization, and our people truly understand their growth potential."

3 LAUNCH A PUBLICITY CAMPAIGN. Just like any major initiative, a new career development program needs a timely and effective communication plan. "It took us 14 months to build our integrated model," says Smurfit-Stone's Fehd. "If we had publicized it early or not well enough, we would have raised expectations or created uncertainty about a pretty sensitive subject."

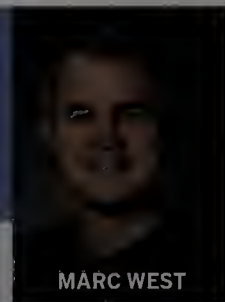
4 PROMOTE LEADERS CAREFULLY. Successful project leaders do not necessarily make great managers, says Linda Brigance, CIO of FedEx Asia Pacific. "People tend to look at great projects and want to promote their leaders," she says. "But we need to pay close attention to how their leadership skills translate in tougher situations. Are they as successful at guiding and motivating their teammates when the going gets tough?"

5 INCORPORATE BUSINESS TRAINING. Burdiss at Smurfit-Stone hired an outside consultant to design a "Business 101" course specifically for the IT team. With sections on the supply chain, supply and demand planning, marketing, budgeting and financials, the business course has gone a long way toward helping the IT people at Smurfit-Stone understand the business they support.

6 USE CROSS-TRAINING. When Barbara Kunkel, CIO of Nixon Peabody, is out of the office, one of her direct reports is acting CIO. Her managers regularly facilitate department meetings, entry-level technical support specialists team up with seasoned staff, and office services employees intern in the IT department during the summer months. "Cross-training is a great career development tool," says Kunkel. "But it needs to be a planned activity with clearly thought-out goals, and it should provide workers with continued job enrichment opportunities once they return to their routine duties."

THE CASE

Moving to an open-source environment with Linux



MARC WEST

Council Member

MARC WEST, SVP and CIO, Electronic Arts

The Challenge »

Electronic Arts' website, EA.com, had grown into the fourth-largest computer games destination on the Web, with 10 million visitors playing a combined 4.5 billion minutes a month. However, as the site grew, technology spending was a disproportionately large hit on the company's bottom line. Each time EA wanted to increase the number of online game players, it had to purchase more Sun Unix servers for its Equinox-hosted data center and license more software.

With the recent launch of EA's new Club Pogo premium games, EA added another 360,000 paying subscribers with plans to double the community in the near future. West was faced with two challenges: Deliver a high-performance, high-availability online experience—and do so at a low initial and ongoing cost.

West believed that switching to a "commodity computing" architecture—using open-source Linux server software on Intel boxes instead of running Unix on Sun machines—could help EA cut its technology costs for online Web games. "Lintel" servers are "cheap, fast and disposable; investment levels are less; and if they burn out or need to be refreshed, you can manage against a shorter and less expensive asset lifecycle," West says. And with the right architecture, they can be scaled up or down in response to business-driven demand.

The Execution »

It took four months to develop and pilot a website for game players to beta test.

"The amount of time and level of effort was no more but no less complicated than any other technology change that a company might do," West says. "Most people would say, 'It would take me forever; I can never leave my current environment.' While it's a change, it's not that complicated."

Lessons Learned »

- Choose a vendor that has experience doing these types of re-architecting efforts. "Each vendor had a cookbook that it wanted us to follow, but none of the cookbooks fit what we were trying to accomplish," West says, adding that a consortium type of approach would have been more helpful.
- Allow some time to fully investigate the legal issues surrounding Linux and the SCO lawsuits. Electronic Arts did and was satisfied that it was safe to move ahead with such a large Red Hat deployment, although EA still keeps tabs on legal issues.
- Have someone on staff with a deep knowledge of Linux in a distributed-computing environment rather than relying on consultants for this know-how.
- Make sure you have won the hearts and minds of your applications and engineering teams. "You do cross a few career paths when you do this," West says. By asking people to switch from the "monolithic computing" world to the distributed commodity computing world, West says, "you're asking people to make a significant change in how they earn their bread and butter."
- Don't believe vendors that say they have a turnkey solution. One size does not fit all even if you buy all of their components and set up the system the way they want.

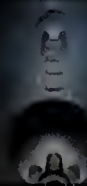


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Michael Schrage | Making IT Work

It's All About the Execution

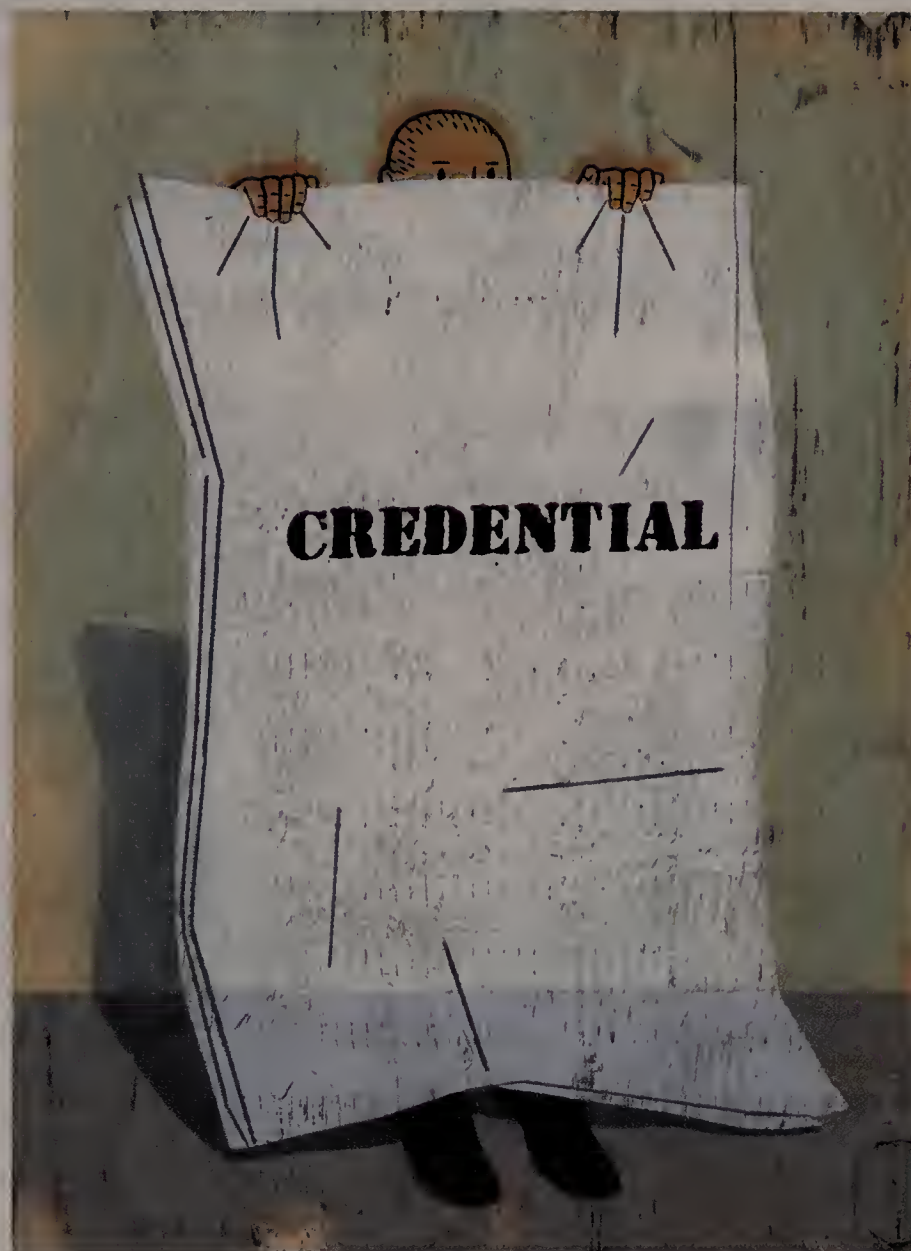
Hiding Behind Certification

An overreliance on IT sheepskins is a recipe for disaster

PROFESSIONAL CIRCUMSTANCES have twice required me to become an “instant expert” on certification. The first time involved grasping the byzantine ins and outs of health-care plan accreditation. The second time required understanding the politics (and economics) of how different universities granted diplomas and certificates for their business, technical and professional extension courses. I learned far more than I bargained for.

Both experiences recalled Bismarck's famous epigram that one should never see either laws or sausage being made. I was shocked. Professional certification and accreditation turned out to be processes as messy, political, misleading and dysfunctional as most enterprise software development and implementation initiatives. The critical difference, of course, is that testing software quality is easier and less ambiguous than testing the quality of a certification.

That's why I've been struck by the seemingly pathological need so many CIOs have for the certification of skills and accreditation of organizational performance. I find this craving misguided and pathetic. What does it really say when someone is Microsoft certified? Or has a certificate in “network engi-



neering” from a quality university? Or if a development organization has a Capability Maturity Model Level 3 rating? Or is ISO 9000 compliant?

In many respects, these questions are as pointless and silly as asking, what does it mean to graduate summa cum laude from Harvard in English? Or, how good a lawyer will you be if you performed brilliantly on the multistate bar exam? Or, to be a total jerk about it, how superior an executive would you be if you had an MBA from a top-20 school?

Unfortunately, these silly and pointless questions are templates for the questions so many CIOs ask themselves when they seek to outsource development or weigh the quality of their own human capital investments. For reasons I fully understand but totally reject, many CIOs increasingly look to certification and accreditation standards as “market signals” indicative of professional quality and reliability. This represents

the laziest and most dangerous kind of cover-your-ass thinking by C-level executives.

The truth—as we all so bitterly know—is that the IT world is filled with certified, credentialed and accredited idiots. I bet you’ve hired a few. I know I have. The fact that someone has an aptly named BS from Harvard topped off with a misleadingly named master’s from MIT does not a good developer (or employee) make. We have to ask ourselves why we make the assumptions we do about individuals with “elite” credentials. The answer says far more about our personal biases than their professional attitudes, aptitudes and skills. Shame on us.

Similarly, the fact that an organization is CMM Level 3 or even CMM Level 5 may be far less revealing about its devel-

The truth—as we all so bitterly know—is that the IT world is filled with certified, credentialed and accredited idiots.

opment capabilities than the Software Engineering Institute (SEI) had in mind. (For more on this, read “Bursting the CMM Hype” at www.cio.com/printlinks.)

What does this have to do with the challenges of IT implementation? Everything. To put it politely, we look at credentials and certifications as brands and risk management investments. After all, how incompetent could a Harvard or MIT graduate be? How incompetent could a CMM Level 4-rated Bangalorean development shop be?

But regular readers of this column know I’m not polite: The business reality is that credentialed brand names are little more than shortcuts for executives who are either too busy or too lazy to do their homework. Don’t get me wrong—I have nothing against shortcuts. The question should be, is this a good shortcut or a bad shortcut?

A Dangerous Delusion

I asked several senior-level IT folks who had overseen significant outsourcing of their operations how much time they actually

spent with their new contractor. Slightly over half of these executives said they spent more than a day visiting the actual worksites of their outsourcer and *not one* spent a cumulative week there before signing the contract. We’re talking tens to hundreds of millions of dollars here.

To a person, these executives waxed on about how these compa-

nies were filled with supremely well-educated engineers from the finest schools and CMM Level 3+ ratings, and so on. To be sure, their references were excellent too. But when I asked these IT execs if there had been a lot of communication between the in-house folks and the outside company to assure cultural and organizational compatibility, the answers were shockingly similar: “We’re outsourcing so that we don’t have to worry about cultural compatibility; we just want the best technical systems and the best possible price.”

Actions Speak Louder Than Credentials

Sorry, folks, but this is a post-industrial recipe for disaster. An overreliance on certification credentials as an IT investment criterion is as professionally dangerous as an overreliance on IQ as a hiring criterion. Frankly, I’m with the school of economic thought that argues that the *real* value of credentials and certifications like CMMs and MBAs is *not* that they indicate greater skill, but they signal to the market that these individuals and organizations will jump through hoops to demonstrate how much they care about being seen as top-notch.

In other words, the willingness to procure credentials can reveal more about attitude than aptitude. That can be critical. One insurance company IT executive told me about how a development shop itched him long and hard about how much it wanted to do some of his company’s cutting-edge development work. The shop’s credentials were impeccable. The client references said the organization was technically excellent but a bit arrogant. So the IT exec invited the shop to send three of its developers to a morning “code walk-through” to see what each side might contribute and learn. The development shop CEO immediately tried to talk him out of that invitation. “At that moment,” said the insurance IT exec, “I knew I would never hire them.”

Actions speak louder than certifications. Unless the act of getting that certification (or not getting that certification) truly says something important about the individual or the organization, CIOs are foolish to give them weight in any meaningful decision process. After all, what does certification really buy you in this development and deployment marketplace?

My observation is: not nearly as much as promised. The dubious quality of so many certifications and credentials inherently mismanages expectations. Few things at C-level IT investment management are costlier than mismanaged expectations. I’m comfortable arguing that, on average, the costs associated with credential-driven IT decision making consistently outweigh the benefits. **CIO**

Michael Schrage is codirector of the MIT Media Lab’s eMarkets Initiative. He can be reached at schrage@media.mit.edu.



PHOTO BY JOHN SOARES

Share Your Opinion

HOW VALUABLE ARE CREDENTIALS? Schrage scoffs at those who accept them automatically as a sign of quality. What do you think? Go to the online version of this column and scroll down to the **ADD A COMMENT** box to let us know.

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Decision Point: Technology Choices for Today's CIO

Fujitsu Computer Systems **INVESTS IN YOUR FUTURE**

TECHNOLOGY is more critical to business strategy than ever. Despite that fact, CIOs are under increased pressure to do more with less: less money, less time and less margin for error.

To minimize these pressures while creating optimal business value, CIOs need help from IT vendors who are more than just technology manufacturers; they need partners and advisors in trusted relationships.

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Drawing upon its 65-plus years of experience in the IT field, Fujitsu Computer Systems thoroughly understands complex enterprise infrastructures and knows how to enhance them with products, services and expertise to achieve maximum business performance.

As a wholly owned subsidiary of Fujitsu Limited, Fujitsu Computer Systems is able to draw from the knowledge and expertise of the



Fujitsu Group to offer high-quality solutions to customers in North America. The company focuses on multiple business areas: IT services, both managed and professional; and platforms, including mobile and desktop computer products, Intel®-based servers and SPARC®-compliant Solaris™-compatible servers.

"Today, corporate IT infrastructures must be

Inside:

- R&D
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- Services

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both cost-effective and reliable," according to Toshio Morohoshi, president of Fujitsu Computer Systems. "Since companies depend so heavily on technology to innovate and compete, it's vital that they work with technology companies that provide true partnership."

Corporate business needs continually grow more complex, stretching around the globe and intertwining with an ever-increasing web of suppliers, customers and distributors. It is imperative that technology

providers keep pace with the challenges these businesses face. Fujitsu Computer Systems realizes this, working with a wide range of software and service partners to deliver comprehensive, customized solutions, no matter how complex the requirements. Fujitsu keeps a tight focus on leading-edge technologies, such as security and

tangle of different point people and technology options, Fujitsu Computer Systems makes it simple: one phone call, one person.

"Companies need to be able to deliver full-package solutions that originate from a single point of contact," says Alan Promisel, a research analyst at IDC in Framingham, Mass. "It streamlines the purchasing process and helps coordinate technology planning. Fujitsu has gone a long way in helping end-users get seamless technology solutions. Vendors really need a comprehensive suite of offerings, and Fujitsu has pushed to accomplish that."

The bottom line? If a CIO can't get the right answer in a timely manner from a service provider, they won't be working with that company. With Fujitsu Computer Systems, the CIO reaps the benefits of a global reach while enjoying a local presence. Truly, the best of both worlds.

INVESTING IN THE FUTURE

To continue offering products and services that push the edge of innovation and excellence, Fujitsu continually primes the pump of research

Drawing upon 65-plus years of experience in the IT field, Fujitsu Computer Systems **thoroughly understands complex enterprise infrastructures** and knows how to enhance them with products, services and expertise to **achieve maximum business performance.**

mobility, which are becoming vitally important to enterprise business today.

"Our focus on research, partners and product provides an integrated approach to enterprise technology and business strategies," says Dennis Mull, senior vice president of sales and marketing at Fujitsu Computer Systems.

"Businesses need more than just technology from their IT vendors," Mull notes. "To extract the full business potential from technology, they need to know that their partners will continue to innovate into the future, as well as provide a strong network of partners to bring a comprehensive array of strategies, products and services."

At the same time, CIOs need a simple, direct method of communicating with their technology partners. Fujitsu Computer Systems knows how to bring the customer relationship to a single point of contact. Instead of navigating through a

to keep its technology vital. "If our customers want to keep one step ahead of their competitors, they need technology that can support future business innovations," says Mull.

That's why the company takes its commitment to ongoing research and development so seriously. Fujitsu has a multibillion-dollar annual R&D budget enabling continued technological innovation. (See box at right on Fujitsu R&D investment.)

Fujitsu holds more than 32,000 patents, emphasizing its ongoing commitment to leading the exploration of new technology developments. This commitment to early adoption of promising new technologies means Fujitsu will remain at the forefront of technological advancement, working through the challenges to give its customers leading-edge access to new solutions.

"We know that CIOs don't have the time or

money to sift through promising technologies on their own, so we commit serious resources to make sure we can do it for them," says Morohoshi. "Our research and development team delivers incredibly reliable and advanced technology in a timely manner."

Moreover, the Fujitsu R&D team works in tandem with customer service, integrating feedback into the ongoing research and product development efforts. "The resulting solutions truly reflect what our customers are telling us they want and need to better compete," says Mull.

SOLUTIONS FOR TODAY

Leveraging the Fujitsu investment in R&D, the current line of products is based on true leading-edge technology. Fujitsu Computer Systems delivers a total IT solution, from mobile and desktop computers to scalable and reliable servers, as well as managed and professional services designed to assist CIOs in aligning IT and business processes for their companies.

The Fujitsu reputation for innovation, quality, reliability and support is well-deserved. The experience and specialized expertise of Fujitsu are exercised across a wide range of industries and public-sector fields, including transportation, retail, education, manufacturing, insurance, health care and financial services. The result: a clear understanding of customer issues and opportunities.

Such a wide range of customers requires an equally wide range of solutions. Fujitsu Computer Systems solutions include:

Mobile Products: Award-winning LifeBook® notebooks range from desktop replacements to ultralight notebooks and pen-enabled models. The Stylistic® and LifeBook Tablet PCs carry the company's commitment to mobility even further. Based on over a decade of design, engineering and manufacturing expertise, the Tablet PCs come with a collection of options, such as slate and convertible models with docking stations or port replicator options.

"Fujitsu Computer Systems has always had a diverse portfolio of PC solutions," says IDC's Promisel. "They are a technology innovator, with an aggressively priced commercial PC lineup."

Enterprise Servers: PRIMEPOWER™ servers from Fujitsu bring together the world's fastest bus technology and the latest in SPARC processor development to provide the best value for the money and system scalability in a Solaris Operating Environment. Fujitsu has incorporated its extensive knowledge and experience designing mainframe data center servers into the entire line of PRIMEPOWER servers. The results are highly reliable, high-

FUJITSU CURRENTLY FOCUSES R&D IN THE FOLLOWING AREAS:

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- Grid computing
- Organic computing
- Peripheral devices
- Display technology
- Semiconductors
- Biotechnology and biometrics
- Nanotechnology
- Robotics

ly available scalable servers that meet the demanding mission-critical requirements of today's always-on businesses.

Whether your business requires entry-level servers, compact and scalable blade systems, or advanced multiprocessor servers capable of handling the most demanding data center applications, the PRIMERGY® line delivers Intel Architecture servers with the rock-solid reliability and industry-leading performance that CIOs need.

Many IT managers now look to combine Intel hardware and open source Linux applications to secure impressive potential cost savings for their organizations. Comprehensive expertise from Fujitsu can help these individuals make the optimum infrastructure platform choice and integrate Linux into their business.

"We offer Linux everywhere that we offer Solaris or Windows," says Mull. "We've also taken Linux to the next level and integrated it inside business solutions to help drive cost reductions and streamline business transactions."

Solutions: The TRIOLE™ global strategy for the design, development and deployment of Fujitsu products, solutions and services helps customers optimize IT infrastructure to their business processes. The TRIOLE strategy strengthens the company's ability to build trusted business partnerships with customers, allowing them to increase efficiency, enhance agility and improve continuity.

The TRIOLE strategy is based on real-life cus-

Fujitsu
PRIMERGY
server





tomer experiences and three core technologies: virtualization, automation and integration. Fujitsu has applied these principles to its TRIOLE strategy for product and system deployment. Solutions developed under the TRIOLE strategy produce new levels of compatibility and consistency that will further optimize entire IT infrastructure environments over time.

One example of the TRIOLE strategy in action is the FlexFrame™ for mySAP® Business Suite solution. The FlexFrame solution replaces yesterday's SAP environment of multiple dedicated, complex servers with a modular concept that

Beyond hardware, service and support, Fujitsu Computer Systems offers worldwide professional consulting services to support enterprise implementations and strategies. Services range from pre-installation services to IT strategy consulting and include the following:

- **Pre-installation Services** such as image loads, asset tagging, site planning and readiness
 - **Installation Services** including large deployments, targeted deployments and migration services
 - **Post-installation Services** through operational services, multi-vendor support and product support
 - **Professional Services** such as performance and capacity, O/S migrations and clustering.
- The final result of this unparalleled integration

"If our customers want to keep one step ahead of their competitors, they need technology that can support any business innovation."

—Dennis Mull, senior vice president of sales and marketing, Fujitsu Computer Systems

incorporates the latest business-critical computing technologies like Fujitsu PRIMERGY servers and Network Appliance storage devices. The FlexFrame solution simplifies the IT infrastructure and offers on-demand provisioning, high availability for application and database servers, and other autonomic features to reduce TCO by 30 percent or more.

Professional and Managed Services: Fujitsu products are backed by a host of service and support resources that enhance their business value. More than 65,000 service and support professionals are available worldwide. Additionally, Fujitsu has built service features into the products themselves, such as remote monitoring and self-diagnostics and repairs. A network of field systems engineers provides on-site expertise, and customers have access to around-the-clock global technical support.

Fujitsu Computer Systems support makes the CIO's job a lot easier by offering a multi-vendor single point of accountability for everything from notebooks to mainframes, as well as offering multi-OS support for machines running Solaris, Windows, HP-UX, OS/390® and Linux.

of technical excellence, service prowess and competitive pricing is that CIOs can choose not just technology, but also a trusted partner to help them grow their business. Fujitsu focuses on standards and compatibility, so CIOs have the flexibility to choose customized, best-of-breed solutions.

"Through its relationship with Fujitsu Siemens, Fujitsu Computer Systems is naturally adopting the world of standards that is found in the volume server market," says Vernon Turner, a research analyst at IDC. "In doing so, Fujitsu Computer Systems can remain competitive while adding value through its service-driven organizations."

By delivering the total IT solution—from notebooks and Tablet PCs to server technology and professional services—Fujitsu Computer Systems helps CIOs build technology strategies that deliver immediate results and create lasting business value.

In times when CIOs are given so much less to work with, Fujitsu Computer Systems delivers so much more: a vendor, an advisor, a partner.

For more information about Fujitsu Computer Systems and its line of products, solutions and services, go to: us.fujitsu.com/computers

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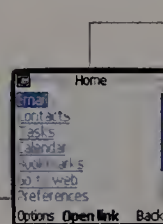
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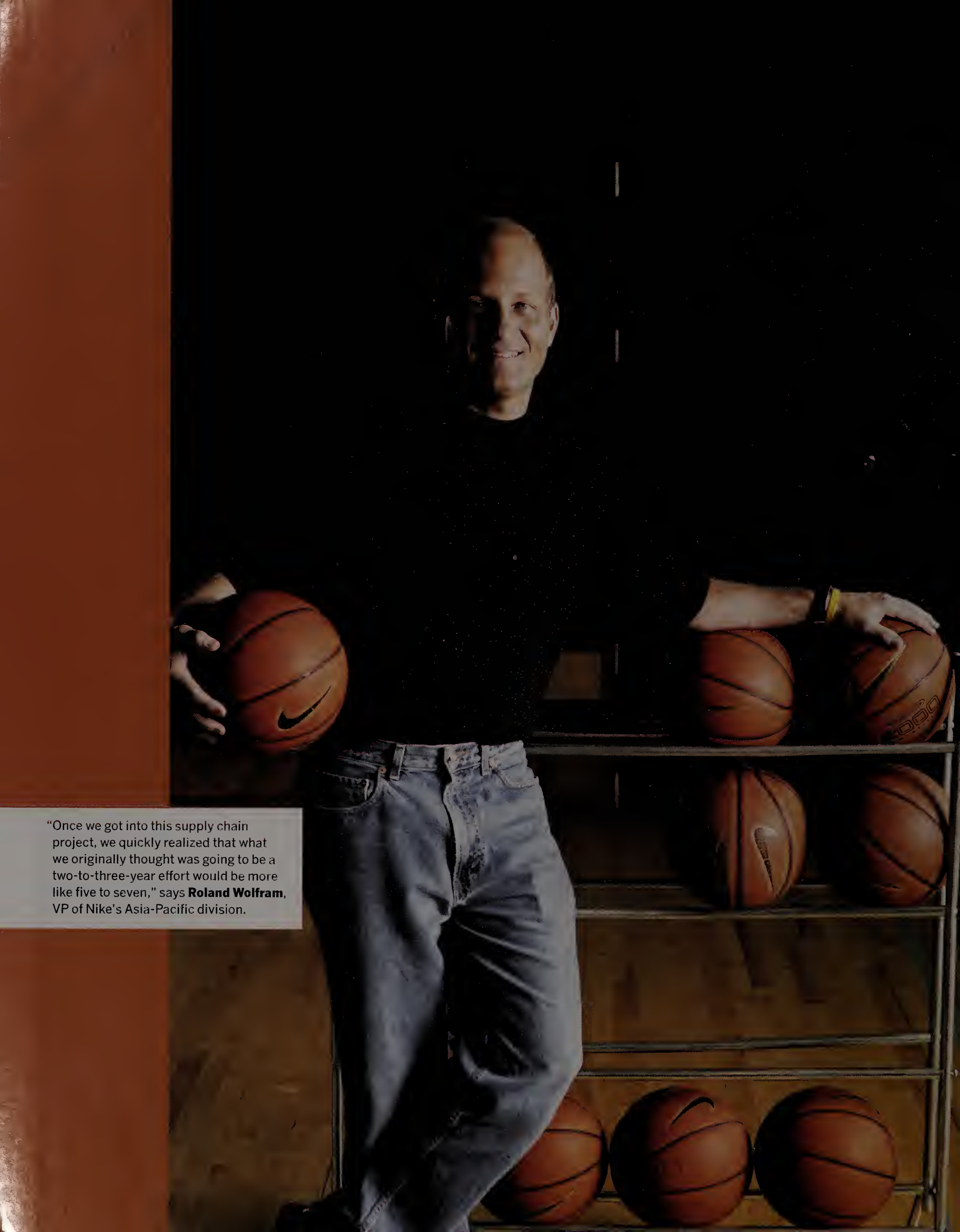


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A man, Roland Wolfram, is standing in a dark room, smiling at the camera. He is wearing a dark, long-sleeved shirt and light blue jeans. He is holding a basketball in his right hand. Behind him is a metal rack filled with many basketballs. The lighting is dramatic, with strong highlights on the man's face and the basketballs, and deep shadows in the background.

"Once we got into this supply chain project, we quickly realized that what we originally thought was going to be a two-to-three-year effort would be more like five to seven," says **Roland Wolfram**, VP of Nike's Asia-Pacific division.

rebound **NIKE**

How (and Why) Nike Recovered from Its Supply Chain Disaster

Too many Air Garnetts. Too few Air Jordans. Nike lost money, time and a measure of pride when its demand-planning software led it astray. How did it recover? Patience, perseverance and, most important, an understanding of what it was trying to accomplish in the first place.

BY CHRISTOPHER KOCH

Reader ROI

- ▶ The limitations of demand-planning software
- ▶ How a robust business plan can insulate tech execs from blame
- ▶ Single-instance strategies in a global environment

“I thought we weren’t going to talk about i2,”

growls Roland Wolfram, Nike’s vice president of global operations and technology, his eyes flashing at his PR manager with ill-concealed ire.

Wolfram, who was promoted in April to vice president and general manager of the Asia-Pacific division, is all Nike. His complexion is ruddy, his lips cracked from working out or working hard, or both. He’s casually dressed, but with a typical Nike sharpness to his turtleneck and slacks, a sharpness reflected also in his urgent, aggressive defense of his company—a Nike pride that would seem arrogant were not the company so dominant in its industry.

Wolfram calls the i2 problem—a software glitch that cost Nike more than \$100 million in lost sales, depressed its stock price by 20 percent, triggered a flurry of class-action lawsuits, and caused its chairman, president and CEO, Phil Knight, to lament famously, “This is what you get for \$400 million, huh?”—a “speed bump.” Some speed bump. In the athletic footwear business, only Nike, with a 32 percent worldwide market share (almost double Adidas, its nearest rival) and a \$20 billion market cap that’s more than the rest



"We wish to God Phil Knight hadn't said what he said," says CIO **Gordon Steele**, pictured here with VP of Supply Chain **Shelley Dewey**. "But when the i2 problems emerged, we sat down and talked about it and he said, OK, I understand, carry on."

of the manufacturers and retailers in the industry combined, could afford to talk about \$100 million like that.

It drives Wolfram crazy that while the rest of the world knows his company for its swooshbuckling marketing and its association with the world's most famous athletes, the IT world thinks of Nike as the company that screwed up its supply chain—specifically, the i2 demand-planning engine that, in 2000, spat out orders for thousands more Air Garnett sneakers than the market had appetite for and called for thousands fewer Air Jordans than were needed.

"For the people who follow this sort of thing, we became a poster child [for failed implementations]," Wolfram says.

But there was a lesson too for people who do, in fact, follow "this sort of thing," specifically CIOs. The lesson of Nike's failure and subsequent rebound lies in the fact that it had a business plan that was widely understood and accepted at every level of the com-

pany. Given that, and the resiliency it afforded the company, in the end the i2 failure turned out to be, indeed, just a "speed bump."

THE i2 FAILURE: TACTICAL OR STRATEGIC?

Nike's June 2000 problems with its i2 system reflect the double whammy typical of high-profile enterprise computing failures. First, there's a software problem closely tied to a core business process—in this case, factory orders. Then the glitch sends a ripple through product delivery that grows into a wave crashing on the balance sheet. The wave is big enough that the company must reveal the losses at a quarterly conference call with analysts or risk the wrath of the Securities and Exchange Commission, shareholders or both. And that's when it hits the pages of *The Wall Street Journal*, inspiring articles and white papers on the general subject of IT's hubris, limitations, value and cost.

The idea that something so mundane as a computer glitch could affect the performance of a huge company is still so novel that it makes headlines. But what doesn't usually enter the analysis is whether the problem was tactical (and fixable) or strategic (meaning the company should never have bought the software in the first place and most likely won't ever get any value from it). The latter is a goof worthy of a poster; the former is a speed bump.

Nike claims that the problems with its i2 demand-planning software were tactical and therefore fixable. It was too slow, didn't integrate well, had some bugs, and Nike's planners were inadequately trained in how to use the system before it went live. Nike says all these problems were fixed by fall 2000. And the company asserts that its business wasn't affected after that quarter. Indeed, at press time, Nike had just announced that its third-quarter 2003 profit margins were its highest ever.

If there was a strategic failure in Nike's supply chain project, it was that Nike had bought in to software designed to crystal ball demand. Throwing a bunch of historical sales numbers into a program and waiting for a magic number to emerge from the algorithm—the basic concept behind demand-planning software—doesn't work well anywhere, and in this case didn't even support Nike's business model. Nike depends upon tightly controlling the athletic footwear supply chain and getting retailers to commit to orders far in advance. There's not much room for a crystal ball in that scenario.

Indeed, Nike confirms that it stopped using i2's demand planner for its short- and medium-range sneaker planning (it's still used for Nike's small but growing apparel business) in the spring of 2001, moving those functions into its SAP ERP system, which is grounded more in orders and invoices than in predictive algorithms. "This allows us to simplify some of our integration requirements," says Nike CIO Gordon Steele.

Wolfram says Nike's demand-planning strategy was and continues to be a mixture of art and technology. Nike sells too many products (120,000) in too many cycles (four per year) to do things by intuition alone. "We've tuned our system so we do our runs against [historical models], and then people look at it to make sure it makes sense," he says. The computer models are trusted more when the product is a reliable seller (that is, just about anything with Michael Jordan's name on it) and the planners' intuition plays a bigger role in new or more volatile products. In this case, says Wolfram, talking with retailers does more good than consulting the system.

"There's been a change in the technology for demand planning," says AMR Research Vice President Bill Swanton, who declined to address the Nike case specifically. "In the late '90s, companies said all we need is the data and we can plan everything perfectly. Today, companies are trying to do consensus planning rather than demand planning." That means moving away from the crystal ball and toward sharing information up and down the supply chain with customers, retailers, distributors and manufacturers. "If you can share information faster and more accurately among a lot of people, you will see trends a lot sooner, and *that's* where the true value of supply chain projects are," Swanton says.

IF YOU HAVE A GAME PLAN, YOU CAN SNAG THE REBOUND

another thing that makes Wolfram angry (his already ruddy complexion going completely red) is the widespread assumption that Nike was betting on algorithms and changed course when that didn't work out. Wolfram says that, on the contrary, i2's demand-planning software was never intended to be the hero of Nike's supply chain project—one of the most ambitious ever attempted by a company its size. It was (and still is), he claims, part of a wider strategy to integrate ERP, supply chain planning and CRM software onto a single platform shared by Nike operations in North America, as well as Europe, the Middle East and Africa (EMEA). "Frankly," he asserts, "we pretty much stayed the course."

Nike made a bold early bet on the risky and difficult strategy of creating a single, giant, integrated database within its SAP ERP system for every employee in North America and EMEA. (Nike's Asia-Pacific division will be on a separate instance of the software.) This meant getting everyone to agree on business practices and common data definitions before the software went in—a rarity in ERP project management.

The difficulty of integrating information across a distributed company has brought down many ERP projects, such as drug-store chain FoxMeyer's SAP ERP system in the late '90s and Tri-Valley Growers' 1997 choice of Oracle's ill-fated ERP package for the consumer packaged-good industry. Neither com-

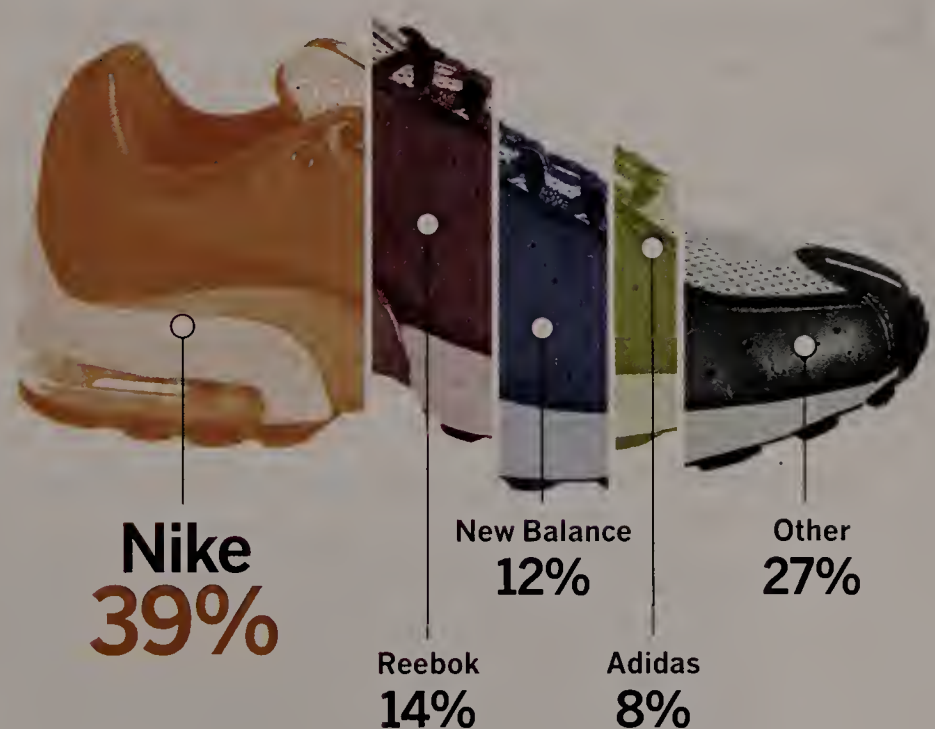
pany ever got its systems working properly and that contributed to both eventually shutting their doors. Other companies gave up on the vision of total information integration and installed many different versions of their ERP systems—as many as 400 different versions, or instances, of a single vendor's ERP system at some really large companies, according to AMR.

But Nike claims it has never wavered from its single-instance strategy, even when problems with the first piece of that strategy, the i2 system, hit the news on Feb. 26, 2001. The same project leaders who were in place at the time of the i2 problems (CIO Steele and the business lead, Shelley Dewey, Nike's vice president of supply chain) are still running the project today. The reason Steele and Dewey survived was because when their system failed, they had a lifeline to hang onto: a clear business case for the overall supply chain project. If achieved, they claim it will save the company a lot more than Knight's \$400 million and the \$100 million in wayward sneakers.

Nike's supply chain project is supposed to drive the manufacturing cycle for a sneaker down from nine months to six. Cutting out that three months would match Nike's manufacturing cycle to its retailers' ordering schedule—they order 90 percent of their sneakers six months in advance of delivery. This means Nike could begin manufacturing its sneakers to order rather than three

Carving Up the Big Sneaker

Nike right now has the fattest slice of the \$16 billion annual U.S. running shoe market



SOURCE: Wells Fargo. Shares are rounded off to the highest percentile.

months in advance and then *hoping* they can sell them. Converting the supply chain from make-to-sell to make-to-order is the dream of any company desirous of gaining competitive advantage through its supply chain. Dell has done it, famously, with PCs; Nike wants to do it just as famously with sneakers.

Nike hasn't gotten there yet. And its business case relies on a nearly 30-year-old model that some analysts and retailers grumble is out of touch with the reality of today's market. But it's a business case Nike's leaders believe in. This is how CIOs keep their jobs when a project goes off track and it's how they keep getting funding to keep it going.

Five Lessons Learned from Nike's i2 Debacle

- 1 Be patient.** Enterprise software implementations can't be rushed and they take time to demonstrate benefits. Nike had the luxury—and good sense—to avoid being driven by hard external deadlines. This enabled it to learn from the mistakes it had made in its i2 project.
- 2 Define a business goal.** Getting software up and running is not a goal; remaking the business is. Nike wanted to take three months out of its sneaker manufacturing cycle. The clarity of its business case sustained the project when things went south in 2000.
- 3 Reengineer processes.** “Blank sheet” reengineering can lead to unrealistic business process designs that can't be implemented through enterprise software. But deep discussions of how business is conducted can lead to something invaluable: a clear, performance-based goal for the project.
- 4 Just do it over.** When poor integration, inadequate training, unstable software and spotty testing derailed Nike's i2 project, Nike redoubled its efforts in those areas to avoid similar problems when it began rolling out its fully integrated enterprise software platform.
- 5 Keep your eye on the prize.** Many companies today are trying to consolidate the separate versions of ERP they installed either to beat the Y2K deadline or to satisfy divisional managers. Nike held fast to a single-instance strategy. It added years to the project but will likely save the company money in the end. —C.K.

Like many truths, this one is simple yet profound: Projects that survive breakdowns do so because everyone in the business, not just IT, understands what the system is supposed to do for the company—and sees value in it. Indeed, after his infamous conference call outburst in 2001, Knight added that, “I think it will, in the long run, be a competitive advantage.”

“We wish to God Phil [Knight] hadn't said what he said,” says Steele with a laugh. “But his belief in this project has never

wavered. [When the i2 problems emerged], we sat down and talked about what the issues were and he said, OK, I understand, carry on.” (Knight declined to be interviewed by CIO.)

HOW NIKE BUILT A ROBUST BUSINESS CASE

Knicht, not normally known for self-control, has shown extraordinary patience with Nike's supply chain project. And he's needed it. “Once we got into this, we quickly realized that what we originally thought was going to be a two-to-three-year effort would be more like five to seven,” says Wolfram.

It's been six years now and counting, with the final stage of the project due to be finished sometime in 2006 at a total cost that has gone from a projected \$400 million to \$500 million, according to Wolfram.

The theme of Nike's sneaker supply chain is centralization. All product design, factory contracting and delivery is planned and coordinated from Beaverton, Ore. The supply chain is built around a six-month order cycle, called the “Futures” program, that was developed in 1975 in response to the then-chaotic market for running shoes. In those days, the Far East sneaker supply chain was in its infancy, deliveries were spotty, inflation was high, and runners bought whatever shoes they could find regardless of brand. Nike won that market by guaranteeing delivery and an inflation-proof discount in return for getting its orders six months in advance. Retailers went along happily because runners didn't much care about style or looks—they wanted technically advanced shoes that fit and were in steady supply. Retailers knew their Nike shoes would sell no matter how far in advance they ordered them.

But as Nike became increasingly global, its supply chain began to fragment. By 1998, Nike had 27 order management systems around the globe, all highly customized and poorly linked to Beaverton. To gain control over its nine-month manufacturing cycle, Nike decided that it needed systems as centralized as its planning processes. ERP software, specifically SAP's R/3 software, would be the bedrock of Nike's strategy, with i2 supply, demand and collaboration planner software applications and Siebel's CRM software also knitted into the overall system using middleware from STC (now SeeBeyond).

Nike's patience was a virtue here too. It skipped AFS (Apparel and Footwear Solution), the initial version of SAP's R/3 software developed specifically for the apparel and footwear industry. Archival Reebok, which partnered with VF (makers of Wrangler Jeans and Vanity Fair bras, among other things) on the beta effort to develop AFS beginning in 1996, struggled for years to implement the buggy, unstable AFS software. (Reebok declined to be interviewed for this story.) And although Nike



"This is what you get for \$400 million, huh?" Nike CEO **Phil Knight** asked famously when the i2 supply chain screwup cost Nike more than \$100 million in lost sales, depressed its stock price by 20 percent and triggered a flurry of class-action lawsuits.

purchased AFS in 1998, it didn't attempt to install it until SAP began working on the second, more stable version of the software. "Most of the early adopters were busy installing AFS in 1999," says Steele with a satisfied smile. "That's when we began spending a lot of time with SAP, sending our people over to Germany to tell them what we'd like to see in the second version."

WHY i2 WENT WRONG

Unfortunately, Nike didn't apply that same patience to the implementation of the first part of its supply chain strategy: i2's demand and supply planner software applications. Rather than wait to deploy i2 as part of its SAP ERP project, Nike decided to install i2 beginning in 1999, while it was still using its legacy systems.

According to court documents filed by Nike and i2 shareholders in class-action suits, little went right before June 2000. i2's predictive demand application and its supply chain planner (which maps out the manufacturing of specific products) used different business rules and stored data in different formats, making it difficult to integrate the two applications. The i2 software needed to be so heavily customized to operate with Nike's legacy systems that it took as much as a minute for a single entry to be recorded by the software. And, overwhelmed by the tens of millions of product numbers Nike used, the system frequently crashed.

But these problems would have remained only glitches had they not spilled over into factory orders. The system ignored some orders and duplicated others. The demand planner also

deleted ordering data six to eight weeks after it was entered, making it impossible for planners to recall what they had asked each factory to produce. Soon, way too many orders for Air Garnetts were going over the wires to Asian factories while calls for Air Jordans were lost or deleted.

When the problems were discovered, Nike had to develop workarounds. Data from i2's demand predictor had to be downloaded and manually reloaded into the supply chain planner by occupying programmers, quality assurance personnel and businesspeople whenever the applications were required to share data—which was as often as weekly. Consultants were brought in to build databases to bypass portions of the i2 applications, and custom bridges were constructed to enable the i2 demand and supply planner applications to share.

Nike claims the kinks were ironed out by November 2000, but the damage was done, affecting sales and inventory deep into Nike's next quarter. When the company's SAP system arrived, short- and medium-range planning moved out of i2 altogether and into SAP. Nike says the \$10 million i2 system was a small part of the \$500 million overall project cost, although some observers assert that the i2 cost was higher.

Why did things go so wrong? Wolfram says Nike lulled itself into a false sense of security about the i2 installation because, by comparison with the SAP plan, it was a much smaller project. (Nike has about 200 planners who use the demand and supply planning systems.) "This felt like something we could do a little easier since it wasn't changing everything else [in the business]," he says. "But it turned out it was very complicated."

"Could we have taken more time with the rollout?" asks Steele. "Probably. Could we have done a better job with software quality? Sure. Could the planners have been better prepared to use the system before it went live? You can never train enough."

NIKE LEARNS PATIENCE

Nike learned from its mistakes. There would be no rushing the SAP installation. And even though Nike executives occasionally questioned the project's complexity and expense, Steele never considered abandoning the single-instance strategy. "We said single instance is a decision, not a discussion," says Steele.

Nike wanted to do a staged, geographically based rollout of SAP, but it also wanted to avoid making each rollout so specific to a region that it would require specialized support. That meant building a design for the U.S. rollout that accommodated some of the peculiarities of the EMEA rollout—such as multiple currency support and different legal restrictions—even though those things were not required for doing business in the United States. This necessitated creating a global template for SAP processes, with all the regions agreeing on the minutiae of doing business.

Naturally, this made each rollout longer and more complex.

Canada, a relatively small (roughly \$300 million) piece of Nike's \$11 billion business, went first, on Thanksgiving weekend 2000 (the pre-spring rush quiet time), with SAP's AFS ERP, a bundle of i2 applications and Siebel's CRM system. Steele and regional Nike executives, dressed in smocks, served Thanksgiving dinner to project employees working around the clock. Other regions—the United States and EMEA—followed on successive Thanksgivings, putting 6,350 users worldwide on the system by the end of 2002. (The last two regions, Asia-Pacific and Latin America, are scheduled for rollout before the end of 2006, according to Nike.) Steele claims he's never had to serve humble pie along with the turkey, saying to date there have been no disruptions to Nike's business from the three rollouts.

This may be because of Nike's newfound respect for training, another weakness of the i2 implementation. Nike's U.S. customer service representatives received 140 to 180 hours of training from highly trained fellow Nike "super users," says Andy Russell, Nike's global transition director. Employees are locked out of the system until they complete the full training course, he says.

WHAT PHIL KNIGHT ULTIMATELY GOT FOR HIS MONEY

So what have six years and \$500 million done for Nike's business? Wolfram claims that better collaboration with Far East factories has reduced the amount of "pre-building" of shoes from 30 percent of Nike's total manufacturing units to around 3 percent. The lead time for shoes, he asserts, has gone from nine months to six (in some periods of high demand, seven). But John Shanley, managing director with Wells Fargo, says, "Retailers are saying it's still closer to nine months than six." Gross margins have increased slightly since 2001 but not significantly.

Inventory levels have been reduced, says Supply Chain Vice President Dewey, by cutting Nike's factory order interval time from one month to a week in some cases. But here, too, the effects may not be trickling down to the balance sheet as fast as Nike would like. Inventory levels are still at the mercy of Nike's fickle audience of teens. Nike's inventory turns were 4.34 per year in 2003, according to *Footwear News*, an industry trade magazine, slightly less than the industry average of 4.39 and behind

rivals Reebok (5.07) and K-Swiss (4.47).

Nike also is behind its rivals in direct point-of-sale (POS) integration with retailers, says Shanley. Supply chain experts agree that actual data from stores, rather than software

SINGLE INSTANCE

If It Was Easy, Everyone Would Just Do It

Nike's global single-instance strategy is the envy of ERP geeks. According to a recent AMR Research survey of 110 big companies (80 percent had revenue of \$500 million or more) using ERP, only 23 percent said they had single instance, while another 36 percent are trying to get there, and 17 percent are trying to at least get their instances down to one per major global region—and spending hundreds of millions of dollars to do so.

Nike can certainly testify to the downside of the strategy—a long, difficult road to process change. But Nike's centralized planning, production and delivery processes for sneakers are tailor-made for the single-instance strategy, because there are few unique, localized processes to mix up that big database. —C.K.

algorithms, are the best predictors of demand. But Nike's SAP system cannot yet accept POS data, though the company says it's working on it.

So far, the most direct benefits of the system have been typical for ERP: improved financial visibility, cash flow management, revenue forecasting, and an ability to juggle Nike's cash stockpile in different currencies to take advantage of shifting exchange rates—benefits that are enhanced by the single database that holds all the data.

But Steele maintains that the best is yet to come. "We haven't changed our processes too much yet," he says, "because we didn't want to complicate the rollouts." Eventually, he believes Nike will get that six-month lead time down to three. But, he cautions, that that would require "significant changes on the part of our retail and supplier partners as well as Nike processes."

He'd better hurry. Shanley says the sneaker market has changed a lot since Nike created its Futures program in the '70s. Retailers don't like having to order products six months in advance when fashions can change in a flash. Rivals are allowing retailers much more leeway in ordering practices, eroding Nike's market lead in select areas.

But because Nike developed a plan in 1998, and stuck with it, the company claims it can make a coordinated global effort to cut that lead time. The system to make that happen is in place—which, given all that has transpired in the past seven years, is rather remarkable. **CIO**

Learn More About Forecasting and Inventory

Nike's not the only one in pursuit of an exquisitely balanced forecasting system. Check out three more stories on **SUPPLY CHAIN, INVENTORY**, and **DEMAND FORECASTING** from the last two years at www.cio.com/printlinks.

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OFFSHORE REGULATIONS:

What to Worry About

As the offshoring debate heats up, CIOs are scrambling to meet the demands of current and pending legislation. Here's what's real, what's not and how to cope. BY BEN WORTHEN

Reader ROI

- ▶ What offshoring legislation will mean for your industry
- ▶ How to predict if a bill will become law
- ▶ How to prepare for future offshoring regulations

The simmering debate over offshore outsourcing boiled over on Feb. 9, when the chairman of the president's Council of Economic Advisers, N. Gregory Mankiw, blandly asserted that offshoring was good for the economy. And while Mankiw's statement may be defensible, or at the very least arguable, its timing and tone revealed a political ear of the purest tin. Not surprisingly, his quote landed on the front page of newspapers nationwide, along with charges that the Bush administration was advocating sending American jobs overseas.

Senate minority leader Tom Daschle, for example, citing Mankiw's remarks, suggested that the White House would have to explain its support of outsourcing to millions of unemployed Americans. And Republican Rep. Don Manzullo of Illinois—where a lot of manufacturing jobs were lost due to offshoring—even called for Mankiw to resign. (He didn't.)

ILLUSTRATION BY MICHAEL WITTE



In any event, offshoring in general, and the Mankiw quote specifically, will more than likely be central to most every campaign this fall—including the presidential, especially given that the media has been raising a hue and cry over the exportation of U.S. jobs offshore. (For more on how the media and companies are wrangling over outsourcing, see Trendlines, Page 22.)

And the legislating and politicking have already begun. By the end of February, state legislatures had introduced 27 bills designed to restrict offshoring. Two bills giving preference to state contractors have recently become law. And while such measures may have a minimal impact on the general profile of offshoring as practiced today, they may be considered the opening salvos in a battle that will only heat up.

“My personal view is that [the debate] won’t end until the day after the election,” says Bruce Josten, executive vice president for government affairs at the U.S. Chamber of Commerce, by many accounts the most powerful pro-business lobby in the country. “It is hard to imagine this being kicked off the front page.”

Cutting costs by hiring cheaper foreign labor may help the economy in the long run, but that’s a hard position for elected officials to take. If voting for laws that restrict offshoring helps politicians win elections, overwhelmingly they will do so. However, as is often the case in politics, many of those votes are more about posturing than policy making. Richard Shell, a Wharton School professor of legal studies and management, suggests that offshoring is the type of issue

where lawmakers vote in favor of a bill and then use parliamentary techniques to kill it after the fact. “To be able to say that they proposed or voted for [an antioffshoring bill] is a very responsive thing to do,” he says. “Actually limiting outsourcing is very hard.”

Groups on both sides of the issue are drawing lines in the sand. The business community has made preserving the right to offshore a top priority. On the labor side, activists are lobbying for measures that restrict offshoring (mostly at the state level) with hopes of establishing a precedent and foundation for national antioffshoring legislation.

And once again, CIOs are caught in the middle. Public-sector CIOs and those whose companies have state or federal contracts face the most immediate risk from legislation limiting how they can source their work.



Your Guide to Offshore Legislation

There are three basic types of antioffshoring legislation either under consideration or already enacted. Here’s how CIOs can cope.

Type of legislation	What it does	Where it's at	How to mitigate the risk
Restricts or prohibits offshoring	Prohibits the government from funding projects that have an offshore component. Companies that contract with states to perform services could not send any of the work offshore.	▶ The Thomas-Voinovich law was enacted but expires at the end of FY04. ▶ The Dodd amendment to expand Thomas-Voinovich to the states has passed the Senate but not the House. ▶ Twenty-eight states have antioffshoring bills pending. So far none has become law.	These bills affect only companies that contract with state and federal governments. The safest course is to keep your company’s government and nongovernment work separate in all ways.
Ensures consumer and employee right to know	Consumer right-to-know laws are designed to discourage offshoring by adversely affecting company image. Some would require call center employees to tell callers where they are located. A proposed Senate bill would require employers to give workers 90 days’ notice if their jobs are going to be offshored.	▶ On the state level, it is likely that one or two right-to-know type bills will pass. ▶ On the federal level, even if a bill mandating notice gets through the Senate, it will never pass the House, where business-friendly Republicans are in control.	Short of not offshoring, there’s not much a CIO can do. Take the PR hit if you must.
Guarantees the privacy of personal data	Prevents companies from sending personal information overseas. That includes medical records and financial data.	▶ Arizona has a bill pending that would prohibit the transcription of medical files outside the United States. ▶ California has a similar bill pending that includes financial data. ▶ It is unlikely that these bills will pass.	Look into technologies that can strip personally identifiable data from files.

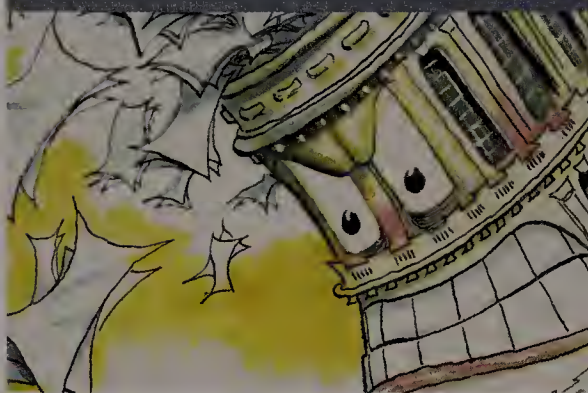
Health-care and financial services CIOs face some elevated risks because of the sensitive nature of the data they handle. The legislation that could affect most other CIOs, however, is in the form of disincentives and obstacles, not outright bans. The U.S. Chamber of Commerce, the Information Technology Association of America (ITAA) and other organizations that oppose anti-offshoring legislation acknowledge that they cannot stop all antioffshoring efforts from materializing. Therefore, CIOs need to start preparing for the inevitable and thinking about how to mitigate (or possibly eliminate) the effects of the legislative highballing down the political road.

With Government Contracts Come Government Restrictions

To date, the most common antioffshoring bills prohibit companies with state and federal contracts from sending their work overseas. The only federal offshoring law in this category, cosponsored by Republican Sens. Craig Thomas (Wyo.) and George Voinovich (Ohio) and signed last January, restricts companies with federal contracts from outsourcing that work overseas. Indus Corp., a software development and IT support services company, signed a 10-year, \$175 million contract with the Department of Transportation in May 2002 to provide IT support for the federal highway administration. And while the company has an operations center in Bangalore, Indus President and CEO Shiv Krishnan says his company no longer uses it for work on any federal contracts. IT support and software development are "fertile ground to offshore," he says. "But we have a contract with lots of restrictions."

Indus, like other companies with contracts covered by the Thomas-Voinovich provision, must be careful to keep its government work separate from its nongovernment work; and its workforce for government projects separate from its nongovernment workforce. Krishnan stresses that the background checks required for employees who work with government data make it next to impossible for his organization to send work offshore. And,

The type of offshoring legislation that could affect most CIOs is in the form of disincentives and obstacles, not outright bans.



in fact, he suspects that this is precisely what future legislation will do to offshoring.

An amendment, sponsored by Sen. Christopher Dodd (D-Conn.) and passed by the Senate in March, would expand Thomas-Voinovich to include state contracts funded with federal money. (It has yet to come up for a vote in the House.) Many state bills already prohibit the use of state funds for offshoring. George Newstrom, secretary of technology for the state of Virginia, which has four antioffshoring bills pending, says that the public sector is particularly vulnerable since it is funded by taxpayers, who feel that the state has an obligation both to preserve and create jobs.

Nowhere was this dynamic more apparent than in Indiana, which last year put out an RFP to upgrade the systems that run the state unemployment insurance program. The winning bid was \$15.2 million from TCS America, the U.S. subsidiary of the Indian IT outsourcing giant Tata. (The next closest bid was \$23.3 million.) Work on the contract was scheduled to begin last October. But the irony of a state outsourcing its unemployment benefits project didn't go unnoticed or unremarked, and within a few months Indi-

ana lawmakers proposed legislation that would prohibit sending state contracts offshore. Meanwhile, faced with mounting pressure, the governor canceled the TCS contract in November. And in March 2004, Indiana enacted a law that would give a 1 percent to 5 percent preference to Indiana companies. (For example, a bid of \$100,000 would be calculated as \$95,000.)

The state's IT procurement process changed even more substantially. "The reason why Indiana companies could not bid [on the unemployment contract] was that they weren't large enough," says Chuck Martindale, the commissioner of the department of administration for Indiana and the head of procurement for the state. "We had put together a project that they couldn't bid on."

Now, the state will attempt to break large IT projects into smaller chunks that it can source separately. "We are doing what we can with policies and procedures to maximize the opportunities for companies that have a presence in Indiana," says Martindale.

Virginia is trying to avoid becoming the next Indiana. The state is facing a budget shortfall of more than \$1 billion, and there is pressure for IT (and all state agencies) to cut costs. But Newstrom says he has already ruled out offshoring as a way to do that. "If we were in a private setting, we would offshore," he says. But he isn't. So he won't.

Health, Finance and Other Privacy Quagmires

Antioffshoring groups have targeted health-care and financial services companies. Rep. Edward Markey (D-Mass.) has spoken about the need to restrict where companies send consumers' data. Both California and Arizona have introduced bills that would make it illegal for health-care providers to send their patients' records outside of the United States for transcription, and California would also restrict companies from sending individuals' financial data offshore.

Partners HealthCare CIO John Glaser admits that he is "a little more wary" than ever before when it comes to offshoring, primarily because hospitals rely on the govern-

ment for reimbursement. Therefore, he says, there's "a greater degree of political entanglement." Partners offshores about 1 percent of its work in the form of transcriptions, radiology reports and low-level IT work. "I'd be stunned if there was legislation that stopped this," he says. Nonetheless, he's mulling over changes he could make that would strip patient information from the data Partners sends offshore.

A major insurance company that asked not to be identified undertook such a project that played out over two years. The company's rate-calculating systems are developed and tested in part offshore. Because of concerns about privacy and identity theft, the IT group built a utility that masks personal information such as names, Social Security numbers and addresses. Offshore developers cannot match the financial information to

individuals. At first, a supervisor offshore who has gone through a background check had the authority to turn off the utility if necessary; but a few months ago, even that exception was eliminated, as the company sought to further tighten control and make certain that no offshore workers could access personal data.

The fact that the system already masks personally identifiable data means the company won't have to undertake such a project in the future in response to regulation. In addition, the company is lucky its development work is offshore, while maintenance is performed in the United States. The development work requires a test environment, rather than live production data, so the company won't have to readjust its work processes to satisfy potential privacy legislation. Most companies, however, do the reverse. "Ninety-nine percent of offshore is support and maintenance, which means they are running production data," says the insurer's CIO. If the government restricts customer data from being sent offshore, "they could essentially cut down that entire tree."

How Offshoring Can Make Retailers Look Bad

Without an outright ban on outsourcing (which parties on both sides of the issue agree is unlikely), the government is powerless from prohibiting most companies from sending work offshore. But it can make it harder. There is one way for the federal government to directly impede the offshoring practices of companies that aren't government contractors or in already regulated industries: visas. The two existing programs used to bring technology workers into the country, the H-1B and the L-1, have recently come under scrutiny. Both facilitate offshoring by allowing overseas workers to come to the United States for training. (For more on the link between offshoring and high-tech visas, see "Backlash," www.cio.com/printlinks.) Both Democrats and Republicans have introduced legislation that would tighten the rules on granting these visas and close the loopholes that



What Will Pass, What Won't

Six questions that will help you predict a measure's chance of becoming law

1 Who introduced the bill? Bernie Sanders is a congressman from Vermont. He is an Independent. In our two-party system that means he has about as much clout as the potted plant in your office. He recently introduced a measure that would stop federal grants, loans and loan guarantees from going to companies that lay off more workers in the United States than in other countries. Don't worry about it. It has no chance. (It did, however, generate headlines for Sanders and made his core constituency feel good about him.)

2 Did it pass the House or the Senate? Bills are far more likely to pass the Senate than the House, and just because they pass the Senate, doesn't mean they'll pass the House.

3 Where do the Republicans stand? Republicans have such a tight grip on the House that no bill is likely to get out of committee unless it has Republican sponsors.

4 Is it attached to a necessary piece of legislation? The only antioffshoring bill to become law, the Thomas-Voinovich provision, which prohibits certain government subcontractors from offshoring, was attached to an omnibus appropriations bill. The Dodd amendment, which would make the Thomas-Voinovich provision permanent and would extend the ban on offshoring of government work to state contracts funded with federal money, was attached to an international tax bill that had bipartisan support.

5 Is it temporary or permanent, narrow or broad? If the terms of an antioffshoring bill are temporary—say it needs to be renewed in a year, or has a clause excluding existing trading partners, or is subject to a study—it is more likely to pass, says Stuart Anderson, executive director of the National Foundation for American Policy, a nonpartisan group that recently released a study of federal and state offshoring legislation.

6 Will it make the candidate or his party look good? Any bill requiring companies to invest in employee retraining has a good chance of passing before the November election.

—B.W.

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allow these workers to be contracted out.

However, it is more likely that the government will take indirect action to discourage the employment of foreign workers. Sixteen states have introduced “right-to-know” bills that would require help desk and call center employees to disclose their location to consumers before conducting business—essentially creating a public rela-

“I am concerned that legislation might take the wrong approach that would be politically popular, but not in the best interest of America in a global corporate environment,” Gardner says. Nonetheless, “if all [offshoring] had to be turned off tomorrow—if we couldn’t do any offshoring anymore—I still have a base of people to do those same jobs,” he adds.

item on its 2004 agenda in exchange for preserving the right to offshore, his organization would consider the year a success.

Ultimately, public opinion will be the main factor in determining whether any antioffshoring legislation will pass. A March *USA Today*/CNN/Gallup poll reported that of 1,000-plus adults surveyed 58 percent said that preventing jobs from going overseas



It is likely the government will take action to discourage the employment of foreign workers.

tions headache for companies that offshore such work. Senator and presidential candidate John Kerry has sponsored such a bill.

These bills and others, such as a Daschle bill that would require companies to give employees 90 days’ notice before their jobs are offshored, are calculated to cast companies that offshore in a bad light with their customers. Steve Williams, CIO of Mattress Giant, says that they are blatant attempts to smear corporate reputations. And they’re working. Williams, who says that his company doesn’t offshore development, is afraid that if he did, his “competition may utilize the fact that I have outsourced 20,000 jobs overseas.” While Williams is an avid supporter of free trade, he says that a CIO would be crazy to start offshoring between now and November.

Some states will probably pass right-to-know laws between now and the election. On the federal level, the most likely outcome is legislation that would provide job training, health benefits and income support to IT workers who have lost their jobs to foreign labor. Jay Gardner, CIO of BMC Software, says that he would support such a measure, even if his company had to pay for it. He considers that to be the right approach for the government to take.

The Sky Is Lowering, Not Falling

Despite all the attention offshoring has received of late, relatively little is likely to happen between now and the election that will put a serious crimp in the practice. The Communications Workers of America is the largest organized labor group specifically targeting offshoring, and even they know that they have to pick and choose their battles. “We’re not going to stop offshoring; we know that,” says Tony Daley, research economist for Communications Workers of America. “We’re [just] trying to set some rules for the market.”

The forces opposed to antioffshoring legislation are better organized, richer and more sophisticated in the ways of leveraging influence. And they have made blocking restrictions a top priority. The U.S. Chamber of Commerce’s Josten, for example, says that if the Chamber has to sacrifice every

would be a very important factor in deciding whom they would vote for this fall; 27 percent said that it would be fairly important.

In light of these numbers, Harris Miller, president of ITAA, acknowledges that some legislation is inevitable. “Congress is going to want to say they did something,” he says. Miller hopes that “something” will be restricted to job retraining benefits for white-collar workers, similar to the benefits that manufacturing workers now get when their jobs are sent overseas. (See “Offshored IT Workers May Get Training Benefits,” www.cio.com/printlinks.)

When these bills do, in fact, pass, business groups like ITAA will make an effort to blunt their impact. For example, the Dodd amendment that restricts how states can use federal funds was itself amended to exclude signatories to the World Trade Organization agreement on government procurement (including many European and some Asian countries, although not India and China), and makes the amendments subject to a review by the Secretary of Commerce.

“We’re lobbying,” says Miller. “That’s what we get paid to do.” **CIO**

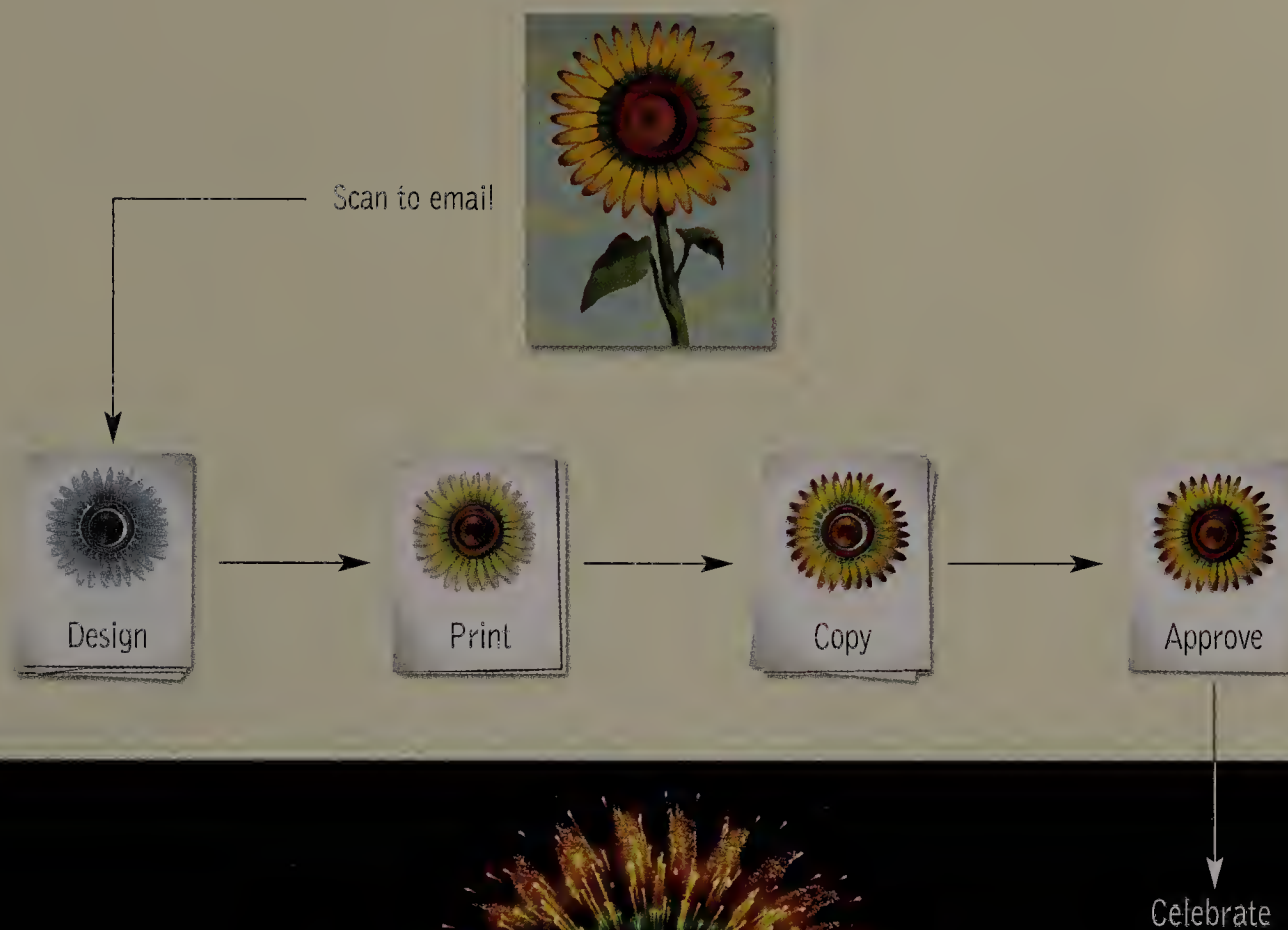
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Will offshore regulation really take root?

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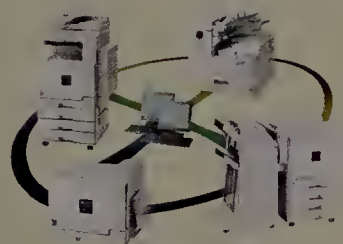
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The *Queen Mary 2*, the most technologically advanced vessel on the ocean, sails past the lower Manhattan skyline last spring.

ALL HANDS ON TECH

Designing an IT system from scratch can be both daunting and thrilling. Now imagine building IT remotely for the world's newest, biggest ship. The story of how Cunard built the *Queen Mary 2*, a veritable floating city. **BY TODD DATZ**

A guest embarking on the *Queen Mary 2*—the world's newest, biggest and most expensive ocean liner—pulls out her smart card and hands it to a smiling security officer in a crisp, white uniform, who scans her through. After settling into her cabin, she flicks on the digital interactive TV and fires off a couple of e-mails. A few clicks away she browses the evening's dinner menu, then orders a bottle of pinot noir, which will be on her table when she arrives at the restaurant. Following some after-dinner entertainment in the theater, she heads back to her cabin, pipes in some Mozart from the TV system's vast music library, orders room service for breakfast and falls asleep.

The \$800 million QM2, built by Cunard Line, a unit of Carnival, weighs in at 151,400 tons and, at 1,132 feet, is a mere 116 feet shorter than the structural height of the Empire State Building. She's the first Cunard cruise ship built in more than three decades, since the company launched the *Queen Elizabeth 2* in 1969, and the only regularly scheduled cruise liner crossing the Atlantic. (The QE2 is now cruising in European waters.) The ship boasts 10 dining venues, a planetarium, a casino, a two-story theater and five swimming pools. Hot tubs and the Canyon Ranch Spa offer relief for muscles sore from shuffleboard. Some 1,250 crew members cater to upwards of 2,600 passengers, a cozy ratio for guests (most big ships have a considerably higher

passenger to crew ratio). The QM2 made her maiden voyage, from Southampton, England, to Fort Lauderdale, Fla., in January. In April, the QM2 sailed from Southampton to her U.S. home port of New York City, where she was greeted with a rousing welcome.

The smart cards and interactive TVs are just a couple of examples of the vast IT capabilities built into the behemoth. The QM2 is a floating city, with integrated systems that make it arguably the most technologically advanced vessel on the ocean. But incorporating IT onto the ship was far from smooth sailing. One of the biggest challenges facing Cunard's IT department was its relative inexperience—the company hadn't built a ship in more than 30 years and didn't have a separate shipbuilding IT division as some cruise lines do. In addition, the QM2 was a new class of ship, so there was no preexisting design to help guide the IT leaders as they plotted major issues like cable drops. And to add more

complexity to the mix, they didn't have access to the ship (which was constructed in France) until late in the building process, so the staff had to construct a deployment center in Miami to build and test the systems. Recently, CIO was invited on board for a day to take a closer look at the IT powering Cunard's newest member of the royal family and find out what sorts of challenges the company's IT staff faced in designing and installing a technology infrastructure from the bottom up.

Reader ROI

- ▶ How IT has helped take customer service on the *Queen Mary 2* to the next level
- ▶ How the ship's IT group designed the systems for a ship being built halfway around the world
- ▶ Why Cunard is using IT to maximize efficiency and raise revenue

ENHANCING THE PASSENGER EXPERIENCE

Guests arriving for their trip can have their picture taken at either the port hotel (at a remote embarkation station), the terminal or the purser's office on board if they're running late. Their passports and credit cards are also scanned. That information is fed into the ship's property management system. The cards then become all-in-one devices that act as room keys, allow passengers to purchase goods (without having to carry cash), and to embark and disembark without having to carry their passports. The *QM2* is the first cruise liner to offer such capabilities in a smart card, says Jeff Richman, director of business solutions and applications development for Cunard.

The interactive television system is one of only three currently in use on ships (the other two are on board two vessels owned by Hapag-Lloyd, a German cruise line). The system, built by IDF, a German multimedia technology company, uses a Philips TV, with a little set-top box running Linux behind it.

Passengers see a menu divided into 11 functional areas of activities and services on the ship, such as classes, restaurants and shore excursions. Supplying e-mail access to every guest in every cabin is cutting edge on the high seas—on other ships with Internet connections, guests generally have to use Internet cafés. (The *QM2* has one of those as well for those who prefer typing messages in the company of others or need the comfort of a staff member on hand if they run into trouble.) Each e-mail costs \$1.50 to send or receive, a charge some guests say they dislike. Guests can also watch on-demand videos.

The system also lets guests shop online, whether it be for a bottle of scotch or flowers from the onboard florist. "Any sale that occurs through this is found money," says Dick Beliveau, IT manager for shipboard systems. Passengers can book shore excursions ahead of time to avoid standing in line at the purser's desk. The system also allows passengers to see how much they've spent on board.

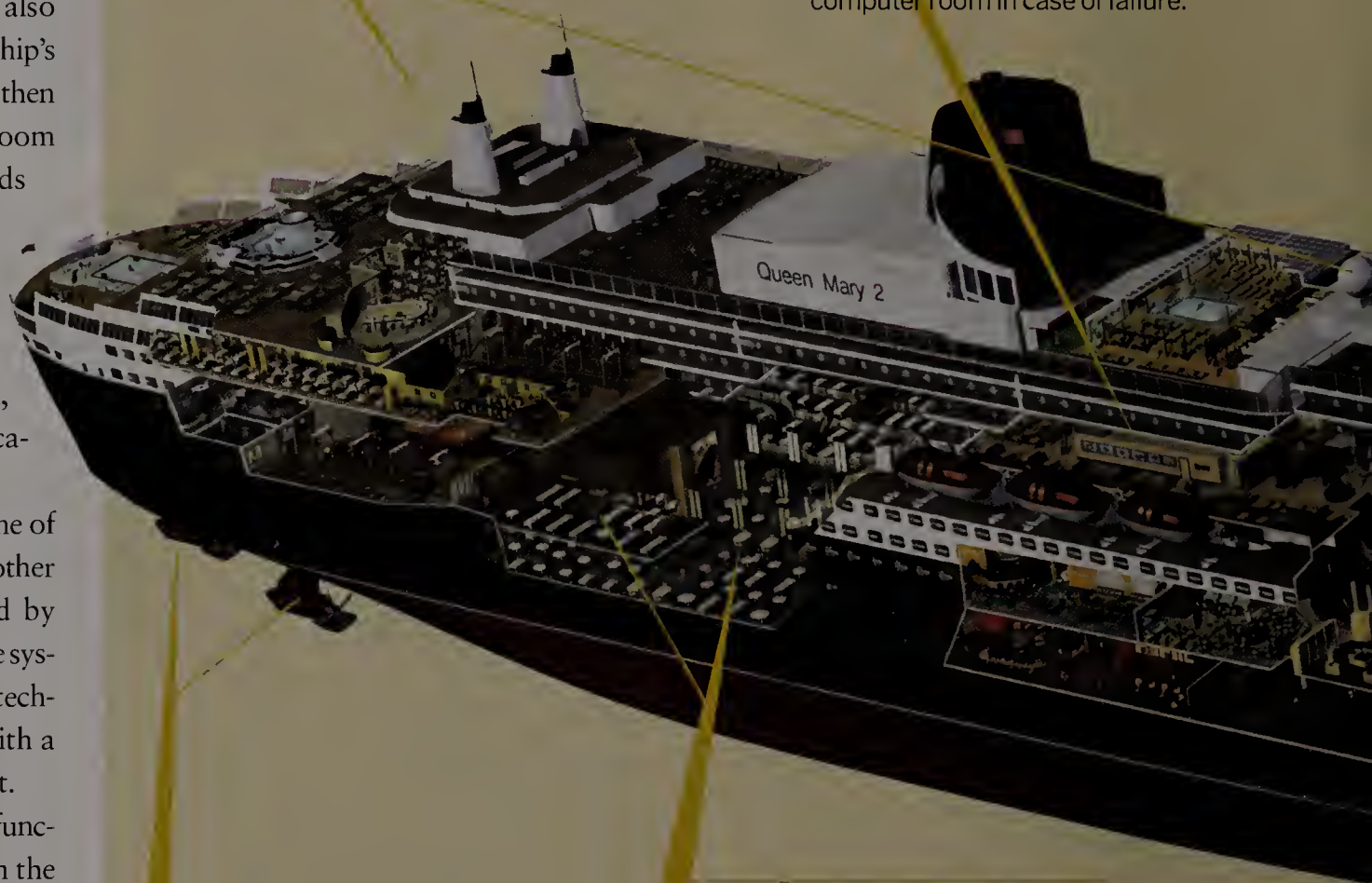
All that functionality is the result of some serious integration. To enable guests to shop,

SATELLITE COMMUNICATIONS

Two satellite antennae allow ship-to-shore communication. Cunard's Miami-based IT staff can connect to IT systems via satellite to resolve onboard IT problems.

MAIN BUSINESS OPERATIONS CENTER

This room, located in the heart of the ship, hosts a rack of servers, the PBX communications system and the PA system. It has a raised floor, fire suppression and redundant power supply. Two other rooms serve as backups to the main computer room in case of failure.



PODS

Four electric motors (pods) pull the ship through the water and provide unprecedented maneuverability for a ship this size—the ship can dock without the use of tugs. Data from the engines is automatically transmitted via satellite.

RESTAURANTS AND BARS

Servers enter orders into the point-of-sale system. Information is wirelessly transmitted to access points on the ceiling, which are connected via cables to the galley. There are 40 or so wireless access points located throughout the vessel. Chefs view orders on two large plasma screens.

ILLUSTRATION COURTESY OF CUNARD

Queen Mary 2 Fast Facts

WEIGHT/LENGTH/HEIGHT

151,400 tons/**1,132** feet/**236** feet

COST TO BOARD

Between **\$2,869** and **\$37,499**
per person for the maiden voyage

COST TO BUILD

\$800 million

PASSENGERS

2,620

CREW

1,250

INSIDE THE QUEEN MARY 2

PASSENGER CABIN

Every cabin has a digital interactive TV. Guests can e-mail, buy products from the ship's stores, sign up for shore excursions and classes, watch on-demand movies and check their billing data.

CABLING

There are 1,550 miles of cable on board. There are some 2,500 data drops throughout the ship.

SMART CARDS

Passenger information is scanned onto the cards, which also contain passenger photos. Guests use them to embark and disembark, buy products and services on board, and open cabin doors.

BRIDGE

The commodore—Captain Ronald Warwick, whose late father helmed Cunard's *Queen Mary* and *Queen Elizabeth 2*—and his staff can navigate using a joystick.

AMENITIES

10 restaurants, **5** swimming pools, casino, theater, planetarium, Canyon Ranch Spa, children's facilities with British nannies

I.T. BUDGET

\$8 million

I.T. STAFF AT CUNARD

28

I.T. STAFF ON QM2

3 computer support officers

MAJOR VENDORS

IDF (interactive TVs), Discovery Travel Systems and Progress Software (property management system), InfoGenesis (point-of-sale system)

the IDF system needed to be linked to the POS system; passengers can access their billing data because of the integration to the property management system. "Richard [Beliveau] and I spent a lot of time looking at the systems interfaces," says Frank Finch, director of global technical services.

Given the vast age range found on cruise ships, Cunard's IT staffers put a lot of effort into making the system easy for passengers of all ages to use, but they didn't do it alone. "A lot of work from the marketing department went into the look and feel. This is way beyond just a straight IT project," says Jeff Boltz, project manager, who led the rollout. To help guests in need of some hand-holding, Boltz trained the stewards and stewardesses in using the interactive TV system, as well as in troubleshooting the hardware. "The clientele are not computer-savvy. They don't understand that the reason they can't key in anything in lower case is because they have the caps lock on," he says.

For Cunard, the system first and foremost improves the customer experience and helps differentiate the QM2 from other ships. Additionally, from an operational perspective, it cuts down on the amount of time crew members spend answering phones or fielding requests in the purser's office. The system also provides more opportunities for onboard revenue—critical to cruise ships where, with space at a premium (even on the QM2), no revenue opportunity is overlooked.

COMMAND CENTRAL

Tucked away in separate, nondescript locations of the ship are three data centers. (These data centers back each other up should any of them fail.) Inside the main business operations center sits a rack of servers, the PBX communications system and the public announcement system (one of the ship's critical safety systems). Hosting those systems in one room represents a design change from traditional shipbuilding. "The big advantage is we could spend more money on the common infrastructure—the raised floor, better fire suppression, redundant power supply," says Finch, giving Cunard's IT crew more bang for its buck.

Finch also designed the room for growth—another break from past designs, in which computer rooms are often glorified closets. “That took quite a bit of changing minds,” he says. “In shipbuilding, people are very set in the ways things are done, and they’re [reluctant] to change their minds, no matter what happens. So it took quite a bit of time with Carnival shipbuilding to convince them how we can make things better.”

Designing an IT infrastructure for the world’s largest ocean liner presented all sorts of challenges for Cunard’s IT crew. “People had to continue their support responsibilities for the 70 or 80 other systems and at the same time learn during this greenfield opportunity of putting all these systems on a brand new ship,” says Richman. Finch did have some experience with shipbuilding IT from previous jobs, so he headed up the project. And he had plenty of support from the business side. “It became very clear to Carnival shipbuilding that IT was no longer a secondary part of the business,” he says.

Finch says that the biggest challenge he faced in the IT design was cabling. Other new

A Royal Competitor

Royal Caribbean also uses advanced IT to enhance the voyage

CUNARD ISN'T THE ONLY CRUISE LINE PUMPING UP ITS FLEET WITH TOP-NOTCH I.T. Royal Caribbean Cruise Lines has recently launched its two newest vessels, the *Mariner of the Seas* (November 2003) and the *Jewel of the Seas* (April 2004), and IT Manager Doug Jones says that they’re the most technologically advanced ships in Royal Caribbean’s 28-ship fleet.

Like the *Queen Mary 2*, those ships have core systems that include property management and point-of-sale systems. They also have wireless access points in many of the public spaces. And passengers are issued smart identification cards that they use for purchases, as a room key, and as a security card to track them as they embark and disembark. Unlike the *QM2*’s card, however, they do not include passport information.

Internet access in cabins is offered to the crews via a thin-client device. “They communicate via e-mail to friends and family. In some cases, they can do financial transactions, such as online banking,” says Jones. He also hopes to complete a direct-deposit project this year for crew members; that’s an important benefit, given that it’s been difficult for staff to receive bank statements in the mail because of their floating addresses. Passengers can access the Internet in their cabins if they bring their own laptops; otherwise, they can surf in one of the public Internet cafés.

The biggest news coming out of Royal Caribbean Cruise Lines? The company has ordered what it’s calling the *Ultra Voyager*, a new ship from a Finnish shipbuilding company, with delivery scheduled for May 2006. At just under 160,000 tons and with capacity for 3,600 passengers, the *Ultra Voyager* will make the *QM2*’s reign as the world’s biggest cruise ship a brief one.

—T.D.

The success of the **technology on board the QM2** masks the ulcer-inducing job the IT staff had in installing it.

ships are typically built in a class—princess, spirit or voyager, for example—meaning there’s a preset design, with predestined cable drops. Not so with the *QM2*, which is, more or less, one of a kind. Some 2,500 data junctions—located in the cabins, the 40 or so wireless access points and elsewhere—thus had to be figured into the construction of the ship. “We started planning over four years ago,” he says. “We had to specify every cable drop location right down to ‘I want it right here on this desk.’ If you miss it, you are screwed.” That’s because cable drops require torching and welding to break through steel and fireproofing. Richman and Finch describe one rare occasion when they did miss: A day before the maiden voyage, the installers

realized they hadn’t cabled one of the deluxe suites. To do so, carpenters had to rip out the wall, take a sample of the wood (they didn’t have that particular material on board), order the replacement from the shipyard in France and send it to Southampton for a speedy repair. “All for a piece of cable,” says Richman.

DATA MANAGEMENT

The heart of the IT back-office infrastructure is the property management system, which handles passenger and crew information. This system manages information concerning the cashless onboard billing environment and who gets on and off the vessel. The other major IT systems interface with the property

management system. On the *QE2* and many other cruise ships, those systems all have their own databases, and linking and replicating them can be cumbersome. One of the major design goals on the *QM2* was to streamline that replication to keep the environment as seamless as possible. In the end, the IT staff reduced the number of replicated databases to three: the PBX, TVs and POS. Making sure that the communications system remains operational if the property management system goes down is a no-brainer; having the other two remain functional means guests can keep charging—an extremely important consideration given many guests likely make a point not to carry much cash on board.

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Infrastructure

The property management system also allows the *QM2* to upload passenger and crew manifests to DHS, which requires cruise ships and airlines to send that information before departure and upon arrival.

Another system that Cunard provides aboard is dubbed AVO, for avoid verbal orders. AVO enables crew members to report issues on the ship without having to pick up a phone or physically track someone down. (Guests can also report any problems they have using their TVs.) For example, if a housekeeper notices a leaky faucet, he reports the problem using a PC. That information is automatically sent to the maintenance staff, where it's assigned to a worker. The worker can also see every other work order assigned to him, which ones must be done that day and so on. Once the faucet is fixed, the worker enters that information into the system. In addition to improving crew efficiency, AVO helps enrich the ship's customer service as well. A hotel manager can call a guest and say, "You reported this broken faucet at 8:00 a.m.; has it been fixed to your satisfaction?" "It's more proactive. It keeps guests happier," says Tom Borgeteien, fleet systems technical coordinator.

AVO is integrated with the ship's planned maintenance and purchasing system. That system (widely used in the industry) stores information on the ship's inventory, such as the types of pumps the ship uses. It also contains the recommended maintenance for each piece of equipment. By integrating AVO with this system, it allows a manager to, for example, prioritize work orders for the maintenance staff. "There are no other systems that integrate the planned maintenance with an AVO-type system," says Richman, referring to the rest of the cruise industry.

Talk to Jeff Richman

Jeff Richman, Cunard Line's director of business solutions and applications development, knows the ins and outs of creating a huge, integrated new system from scratch. If you're tackling that—or a titanic makeover—and want some advice, just **ASK THE SOURCE**. Richman will be online to answer your questions through June 30. Go to www.cio.com/experts.



cio.com



New York Mayor Michael Bloomberg (right) and NYC & Co.'s Chairman Jonathan Tisch (second from left) meet with Queen Mary 2 Commodore Ronald Warwick (left) and Cunard Cruise Line President Pamela Conover as the *Queen Mary 2* docks in New York Harbor in April.

The wireless access points on the vessel truly make the *QM2* a 21st century vessel. All the restaurants and many of the bars use Wi-Fi to connect guest orders—entered at workstations by waitstaff—to access points on the ceilings, which are then routed via cables to the galleys. In the largest restaurant on board, chefs view the orders on two large plasma screens. And at some of the bars, waiters use handhelds to enter drink orders, which are then transmitted wirelessly to the bartenders.

When problems do arise on any of the on-board systems, there are three computer support officers on board for each cruise. If there is a problem the computer support officers can't handle, the IT staff based at Cunard's headquarters can connect to the systems via satellite and handle it remotely. That's a big change from the days when it was sometimes necessary to ferry troubleshooters out to a ship via helicopter.

TEARING UP THE PROJECT PLANS

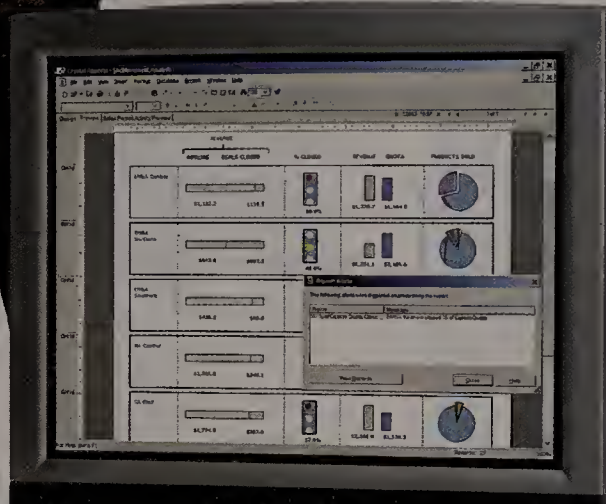
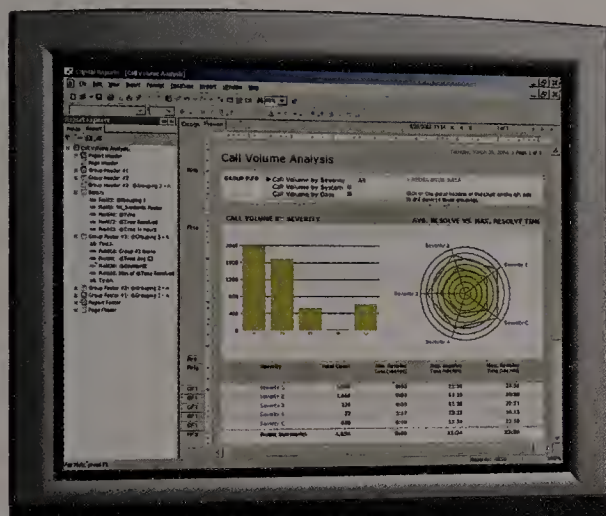
The success of the technology on board the *QM2* masks the ulcer-inducing job the IT staff had in installing it. As previously mentioned, they had to build the IT system in a deployment center while the ship itself was being built at a shipyard in France. At this deployment center they painstakingly installed, integrated and tested all the systems. They then took all the

equipment apart, boxed it up, and shipped it in crates across the Atlantic, where they had about three months to put it all together and make it work. Finch also had to discard his project plans once the installation began. "We had a beautiful plan. Within two minutes, it went into the bin," he says, likening the environment—which at one point last December had 6,000 workers frantically hammering, welding and wiring to finish the ship on schedule—to controlled chaos.

Installing the equipment actually became an exercise in strength and stamina. Beliveau, Boltz and just a few helpers had to install the TVs in every guest cabin without the benefit of a working elevator. "If the cabin was on deck 11, that meant 11 flights of stairs," says Beliveau. Finch spent three months running around the ship, trying to manage the disorder. At one point, it took him three days to chase down someone who could turn on a breaker to get power to his equipment.

In the end, the *QM2* was christened on time by Queen Elizabeth II in early January and has been sailing for five months with nary an IT hitch. "We pulled it off," says Richman, summing up the efforts of a 28-person IT department that has become master and commander of the world's largest floating IT shop. **CIO**

Send your tales of building IT infrastructure against all odds to Senior Editor Todd Datz at tdatz@cio.com.



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Attend an IKON
Insight Series
event near you.
To sign up, visit
IKON.com/insight.

A photograph of a desk with two different printer models. A red arrow points from this image to the central sticky note.

Clustered solution
could automatically
send jobs to
another printer.

A photograph of a person sitting at a desk, looking at a computer monitor. A red arrow points from this image to the central sticky note.

Storing these
electronically
would make them
easier to access.

**WHAT A WASTE
OF VALUABLE TIME.**

A photograph of a person standing in front of a large, complex piece of office equipment, possibly a multi-function copier or a server rack. A red arrow points from this image to the central sticky note.

Could manage
all printers
from her office
with remote
monitoring tools.



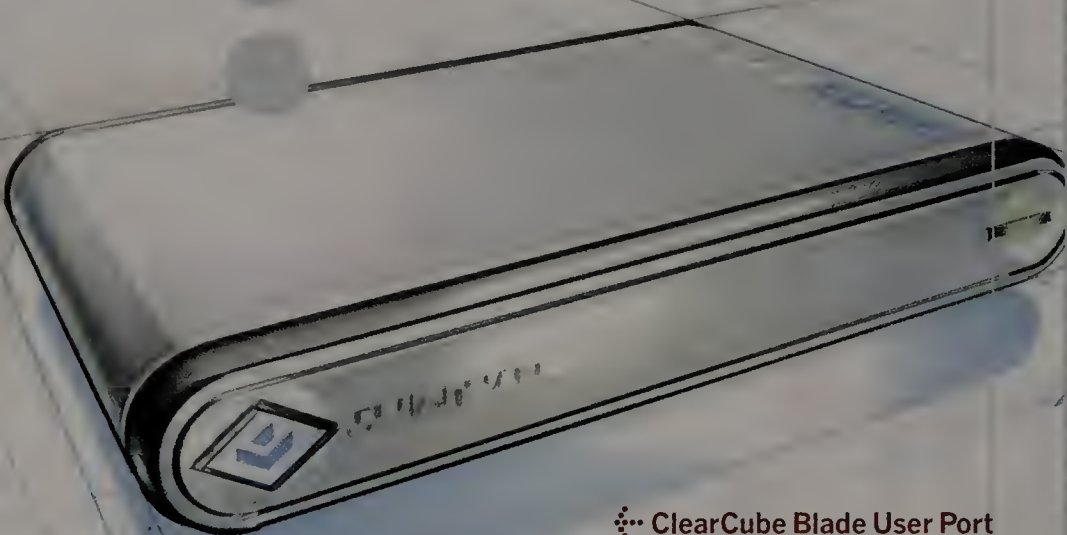
4 concept computers

New PC designs may not reach a mass audience, but some features point to the future of computing

BY GALEN GRUMAN

Look around the office. What do you see?

Offices filled with PCs in tower cases, or black notebooks neatly docked to their monitors. Could that change? This year, the enterprise will see two new types of PCs vie to replace the traditional desktop and notebook: the blade PC and the modular PC. Even the common PC and notebook designs are changing. Analysts, however, are betting on the evolutionary designs rather than the revolutionary ones. "Change is a four-letter word," says Enderle Group analyst Rob Enderle. Still, designers keep trying to come up with something new to appeal to computer buyers. Here's a preview of the main contenders.



ClearCube Blade User Port

Blade PCs

Lock it up in the data center. That's the idea behind blade PCs, such as those from ClearCube. The blade systems offer centralized, secured management advantages similar to the mainframe-and-terminal systems—while providing a standard Windows environment for applications, says IDC analyst Roger Kay. Blades rely on network connections to users' desktops to deliver screen updates and receive mouse and keyboard input. Users can log in from any location and still see "their" PC. Companies also gain greater security since the hardware and storage all live in a secured data center. But unlike thin-client PCs and the original computer terminals of the pre-PC era, blade PCs run standard Windows programs, allowing IT to preserve the existing computing environment.

It's not all upside for blades, of course. The systems require significant network resources—often necessitating dedicated cabling and infrastructure—and increased network management, which can neutralize any hardware savings, says Kay. Thus far, security- and space-conscious financial trading floors and other financial organizations are the primary blade users. Government institutions (particularly those involved with intelligence and defense), as well as some hospitals (where employees are mobile, and the heat and noise of a PC is intolerable), are also early blade adopters, Kay says.

ClearCube pioneered the blade design, and IBM Japan is now reselling the ClearCube blades to test the market. And Hewlett-Packard has already started selling blade PCs.

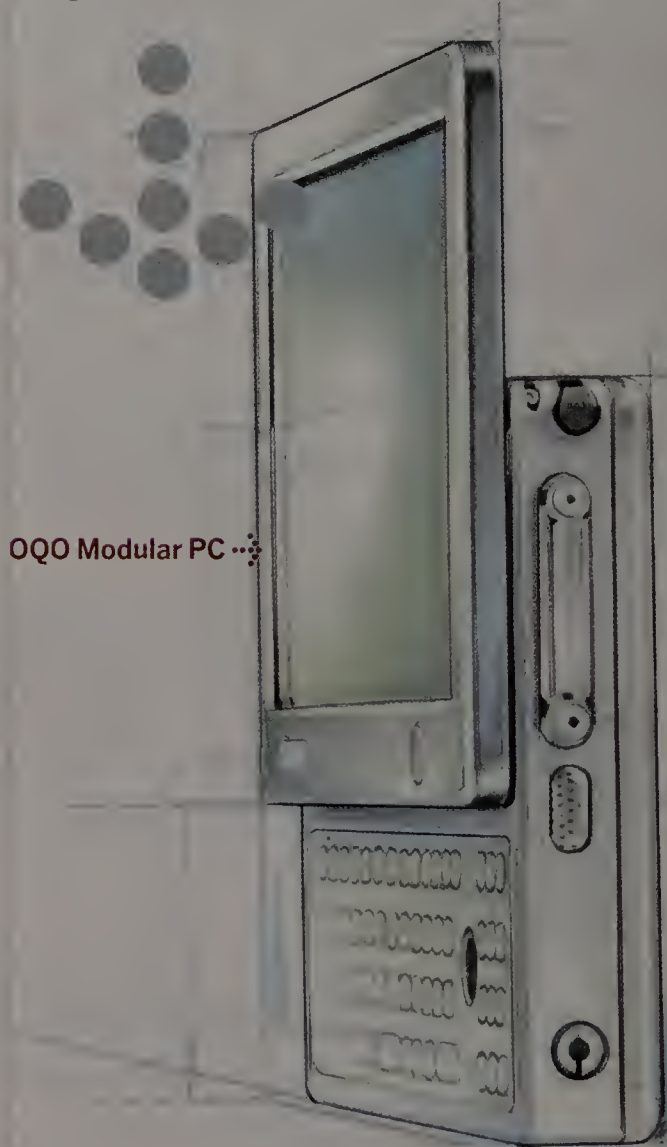
Modular PCs

Apple Computer's Newton made the idea of a handheld computer seem plausible—technologically succeeding Palm and Pocket PC devices. However, Newton capabilities remain considerably less than a fully enabled PC despite its improved processing power. But designers haven't given up. Several firms are proposing the so-called modular PC, a handheld device that runs standard Windows XP and other conventional PC applications. The goal is to give mobile users the full PC experience on the go—without the inconvenience of a notebook's weight or size. Need a standard monitor, mouse, keyboard or extra storage? No problem, just attach them via a docking station.

There are certainly still some hurdles—the lack of a real keyboard, for instance. But the success of the BlackBerry and its thumb-based data entry function gives modular PC makers hope that the minikeyboards on their devices won't be a barrier to adoption. Analysts, however, fear that the modular PC will be too costly given the required miniaturization. Forrester analyst Simon Yates, for instance, predicts that a future generation of light, powerful tablet PCs (a sector that itself has not taken off as well as some pundits and vendors had hoped), rather than modular PCs, will dominate the market for truly portable computers.

Startups Antelope Technologies and OQO expect to ship units this year, while Tiqit has been saying for several years that its models are coming soon. Vulcan, one of Microsoft cofounder Paul Allen's companies, has shown a similar device called the FlipStart.

OQO Modular PC



Integrated PCs

For years, vendors have demonstrated highly integrated PCs that save desktop space and provide a consistent environment for IT to manage. For example, network connectors and video display adapters—once separate add-in cards—have become standard motherboard components in many PCs. And PC makers have followed Apple Computer's lead by replacing a potpourri of ports with high-speed FireWire and USB 2.0 ports that make it easier to add storage devices, digital cameras, printers and more as needed. The added benefit is that PCs no longer need extra internal drive bays. The result: "There's a lot of air in these [traditional] boxes," says Yates.

In response, most vendors have simply slimmed down the cases, but some also see an opportunity to add new features. HP, for example, worked with Microsoft a year ago on its Athens concept, which let the PC easily double as a teleconferencing system. This year, HP is experimenting with its Matisse 2 prototype—which includes a dedicated printer and video camera. While this concept is aimed at small-business users, it could easily be adapted for use by call center reps and salespeople.

◆ Hewlett-Packard Matisse 2



Intel Convertible Notebook ◆◆◆



Adaptable Notebooks

Perhaps the most varied computing form in the enterprise is the notebook PC. Most companies have the standard big-slab, desktop-replacement notebook for the troops and the slimmer, cooler, pricier notebooks for execs and other favored staff. Specialized devices such as tablet PCs and notebooks may also be an option for some users, though only about 450,000 tablet PCs were sold in 2003, and ultraportables of all designs account for less than 10 percent of notebook shipments, analysts say.

Both Forrester analyst Yates and IDC analyst Alan Promisel expect to see a variety of traditional clamshell notebook designs, including models weighing less than 3 pounds and some less than an inch thick that still hold two drives. But notebook transformation will be about more than thin and light, Yates says. Cheap, fat, heavy notebooks using desktop components, for instance, make a lot of sense as desktop replacements, even if they function poorly as mobile devices. He therefore foresees a return of the "luggable" as IT looks to keep costs low.

And Intel—king of the PC processor—is working on a new twist in notebook design through a series of prototypes collectively called Florence: Detach the keyboard, and it's a tablet PC; reattach the keyboard, and it becomes a standard notebook. Florence works better as a desktop system, letting users position the monitor and keyboard separately, which can reduce neck strain and other ergonomic ailments. Furthermore, it saves IT the cost of components commonly used with corporate notebooks—docking stations, extra monitors, keyboards and mice. A built-in camera and audio system lets it handle teleconferencing, and fingerprint identification helps to increase security. **CIO**

Galen Gruman is a San Francisco-based freelance writer. Technology Editor Christopher Lindquist can be reached at clindquist@cio.com.

Reality Bytes

A Cold Look at Hot Trends

Happy Employees, Happy Customers

Bleeding-edge technology means nothing if employees aren't well-trained and well-cared for

BY THOMAS WAILGUM

TO BORROW A PHRASE, it was the best of times; it was the worst of times. It was July 27, 2003, just after 5 a.m., when my wife delivered our identical twin boys. Unfortunately, they arrived far too soon, at just over 24 weeks into her pregnancy, almost four months premature. At less than a pound and a half each, their extreme prematurity prevented their bodies from working properly. Organs hadn't fully developed (their lungs were paper-thin) and Mother Nature, working on her own schedule, wasn't due to jump-start the rest of their delicate systems for months.

Enter modern medicine, characterized by a lot of good technology and many talented people.

The sphere of technology encompassing the babies' everyday existence was intense. Their isolettes (modern-day incubators) were a haphazard arrangement of life-sustaining cords—tubes for feeding, breathing and drawing blood, and wires for heart, lung and blood pressure monitors. Random computerized beeps and heart-stopping alarms shook my wife and me. It was both impressive and overwhelming.

As you might expect, the hospital staff told us that the technology behind all of the medical equipment had made expo-



stantial improvements during the past decade. One of the respiratory therapists half-joked that 10 or 15 years ago, if they had called him at home to come in when our boys were delivered, he would have rolled over and gone back to sleep. Given their low weights, there was no technology that could have kept them alive. We had always envisioned what their first Christmas would be like—their due date was Nov. 12—but now it was hard to fathom, watching them writhe under UV lights and a plastic wrap that kept the moisture on their brittle, red skin.

What impressed me more than the high-tech medical devices (and there were many) was how dedicated people made the most of old technology. Our situation depended so much more on the people behind the technology. It doesn't matter whether it's in a hospital, at a tire dealership, in a department store or on a factory floor: If you have IT systems (whether in a legacy environment or a leading-edge shop), then you need to make sure that

ILLUSTRATION BY PETER HORVATH

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*SOURCE: **CIO** READER PROFILE STUDY,
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The Resource
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the people using those systems are happy. Happy? Yes, that's right, happy.

Comfortable with the Old as Well as the New

Granted, the word *happy* isn't the most informative word in the English language, especially as it relates to technology and IT workers. But stick with me.

Brigham and Women's Hospital in Boston, where the boys were delivered, is a busy, urban medical facility. Our experience at the Brigham and its Newborn Intensive Care Unit, or NICU, was a study in the best of the old technology combined with the best of the new breed. You got the sense that whatever worked the best (whether it was a weathered X-ray machine, brand-new IV regulator or 1970s-looking Jet ventilator) stayed in service. It was that simple. New did not necessarily mean better, and old wasn't bad if it still worked. And you could tell by talking with the medical staff using and servicing the equipment that they felt comfortable. I would even say, happy.

For example, the respiratory therapists, who monitored the boys' breathing, among other duties, used a high-tech machine that could take a small amount of the boys' blood and within seconds give a readout on the relative levels of oxygen and carbon dioxide in their bloodstreams. (It gives new meaning to

important patient information. To be sure, the NICU was not devoid of computerized medical equipment, which greatly enhanced the boys' care. The laptops, for one, could be whisked around to any place in the crowded NICU—to update patient data and check on the status of medications. There seemed to be at least one PC for every worker, and monitors to track vital signs decorated each preemie's bedside.

A Customer by Any Other Name

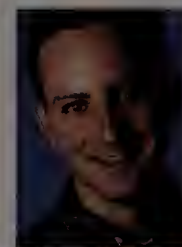
The boys' hospital stay served only to reinforce the concept that everyone in business strives for: enhancing the customer experience. (Strange as it sounds, we were customers in the hospital.) And the success or failure of that experience always comes down to the people working with the systems—and most definitely not the systems themselves. The technology in IT becomes secondary to the people who give you the information when your child is clinging to life. The intense emotions, the uncertainties, the need for answers—it's so much more important than the IT systems those employees are using. In the competitive race of 21st century business, it's easy to forget that IT systems are simply tools to help facilitate and personalize service. That's it. They can, however, depersonalize service if they are used incorrectly, which makes it all the more critical to train both in terms of systems as well as effectively dealing with customers—and empathizing with them.

How many times have you been frustrated with a bank teller or car-rental agent or sales clerk who kept disparaging the “new computer system,” as you stood there wondering whether it really was the technology or inadequate training or the fact that she really didn't care? Whatever the underlying cause, my point is that happy employees are those who understand the systems they are using, feel safe with you standing next to them as they use those systems and most certainly make you feel good about your customer experience.

While I'm by no means advocating for a return to the age of green screens and vacuum tubes—I'm aware that preemies wouldn't stand a chance without technology advances—I'm simply pleading for a return to common sense when it comes to technology decision making.

If you truly value your customers, then don't forget to tend to the care and feeding of your employees servicing them. Because simply installing a new customer-facing system won't improve the customer experience if employees aren't adequately trained to use the new system—remember, make them happy. And if you don't show your employees you care, then they probably won't care about the customer experience either. **CIO**

Staff Writer Thomas Wailgum is happy to report that, after 137 days in the NICU, his babies did spend their first Christmas at home. He can be reached at twailgum@cio.com.



IT systems are simply tools to help facilitate and personalize service.

bleeding-edge technology.) It was amazing, and the new device clearly made the therapists' lives (and ours) easier. But the therapists also used older versions of ventilators—I kept wondering where replacement parts would come from if one of them broke.

But the ventilators didn't break; indeed, all the various machines worked flawlessly. And the respiratory therapists were completely at ease using the older technology. I asked several of them on different occasions if they were concerned about these tired-looking ventilators. In one way or another, they all responded that newer technology wouldn't necessarily improve the care they were providing to patients.

Other experiences further illustrated this. While preparing to donate blood for the boys' transfusions, I was struck by the “green-screen” terminal that the technician was using to input my data. It was slow and looked like it might be on loan from an IT museum, but it did the job well, and he was comfortable using it. We even joked about its age.

While those elderly terminals jumped out at me, it was easy to miss the wireless laptops that were sliding around the NICU, making it less cumbersome for staff to input and monitor

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From Inception to Implementation—**IT That Matters**



Today's CIOs depend on middleware more than ever. First-generation products were child's play compared to what the current technology can do.

Proprietary to Open: Middleware Evolves

BY LAUREN GIBBONS PAUL

MIDDLEWARE | London institutional brokerage Prebon Yamane Group could be considered a throwback in at least one regard. In this age of e-business, its brokers take orders exclusively by telephone from institutions all over the world.

But in another sense, Prebon is on the cutting edge. Its technology group uses sophisticated middleware from Sonic Software to ensure that its customers and brokers get almost immediate electronic trade confirmation; previously, they would have waited hours or even days for fax notification that the deal had gone through.

Since Prebon is a voice brokerage, the capability to send online, near-real-time confirmation of clients' trade details boosts customer service. "This is a revenue exercise. We're aiming to retain our customers by giving them greater efficiency in dealing with us," says Geoffrey Sanderson, CEO of Prebon Technology Group, the IT arm of the \$434 million brokerage.

The software Prebon uses—SonicMQ—is an enterprise message server. And it's merely one example of the variety of modern products that expand on middleware's traditional role as "glue" to tie together disparate applications. With a generous push from XML and Web services,

ILLUSTRATIONS BY BRIAN RASZKA

middleware has moved away from proprietary schemes toward flexible, open standards. And new vendors such as Ascential Software and Sonic Software have joined traditional players such as Tibco and Information Builders in offering cost-effective applications that target specific pieces of the integration puzzle.

Rather than going away, traditional middleware has branched out into subtypes including service-oriented architecture (SOA), enterprise service bus (ESB), business process management (BPM) and Web services. The

Because each connection among systems had to be coded manually, first-generation middleware was also very inflexible. If a mortgage company wanted to change the maximum age for a borrower from 60 to 70, for example, there was no way to make the change in one place and have it cascade through all affected data. As a result, maintenance of systems connected by middleware was expensive.

And the companies' investments of money and time made it easy for their vendors to sell them multiple products and services. "They

Why Web Services Won't Replace Middleware

Web services has been heralded as the greatest thing since the last great overhyped technology (pick your favorite). In the year or two since Web services arrived as a mainstream technology, some have touted that the technology spells the end of middleware altogether because it leverages freely available open standards. Why would CIOs pay a middleware vendor for what they could do themselves with a minimum of fuss, using connections already built into every application they own?

In fact, reports of the demise of middleware are not just exaggerated, they are completely incorrect. First, Web services by definition is a subset of and complement to traditional middleware, rather than a mutually exclusive technology. Most middleware customers today are evaluating how to inject Web services into existing environments to achieve ever greater speed and efficiency. And many longtime middleware vendors are looking to move their products into a Web services space, sometimes by providing the management tools necessary to properly orchestrate Web services. (It's one thing to say that two Web services will talk nicely to each other; it's another entirely to make a few dozen of them work effectively together.)

For another thing, Web services is an unproven technology that is still at the early adopter stage. The Web services honeymoon is not yet over. Web services often uses a polling architecture in which the Web service polls the legacy system to access its data. That can add up to a major performance hit on the mission-critical mainframe systems. And when you open up a critical system to a Web application under Web services, security issues are bound to arise—issues that must be addressed before Web services can hope to completely take over as the next evolution of middleware.

—L.G.P.

With a generous push from XML and Web services, middleware has moved away from proprietary schemes toward flexible, open standards.

diversification results from an increasing need for CIOs to find ways to integrate evermore disparate systems, from ancient mainframe applications to the latest Java servers. Integration, and therefore middleware, is today's cost of doing business.

Early Days

Middleware first appeared in the mid-1980s (though the term itself didn't take firm hold until the 1990s and has morphed in meaning over the years). Even at the dawn of the client/server revolution, large companies were grappling with how to extract data from mainframe systems and serve it to other platforms. Middleware provided that connection. Unfortunately, these products used proprietary frameworks for communication, and they often required hand-coding for each system. The result was costly software and long-term projects that focused on making the IT function more efficient rather than delivering and retaining customers or igniting sales.

"Traditional middleware was too expensive, too hard, took too long and required too much training. It was very IT-centric," says Eric Austvold, research director for enterprise applications and technology strategies at AMR Research.

used middleware to entice you in," recalls Sanderson, who has used various middleware products for many years. Once you committed to one vendor's platform, it was tough to change and there was every reason to keep buying more from that one company.

But during the 1990s, the drumbeat of standards began to grow louder. Customers started to push software vendors to offer application programming interfaces (APIs) as backdoors into their closed environments, thus making integration easier.

Then the Internet took hold, with its plethora of data transmission and access standards, including HTTP, FTP, simple object access protocol (SOAP) and XML. The last of these set the stage for Web services, a relatively simple, standardized way of integrating applications. The goal, ultimately, is to go beyond simply linking applications loosely together, but instead to integrate pieces as needed, quickly and easily, thereby creating "composite applications."

For their part, middleware vendors voice support for standards in the same breath they defend their proprietary value-add. "Standards reduce our development cost," says Ram Menon, senior vice president of worldwide marketing at Tibco. "XML is a normal-

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"When you move a big chunk of your day from troubleshooting to planning and implementing, it makes you really excited to come to work."

Heather Baker
IT Director, K2 Sports

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ized format. It will get the data moving, but the applications still can't talk to each other."

It's hardly surprising that vendors are trying to carve out their own special place in this volatile, near \$1 billion market. But they make some moves grudgingly. "If you're BEA, you still don't want your stuff to be used in an IBM project. If you want to connect BEA to IBM, you can do that thanks to standards, but you can't expect BEA to be happy about it," says Gerry Cohen, president and CEO of Information Builders.

"The large vendors are seeing the benefits of being open. They're not 100 percent there, but they are much more open than they were," adds Barney Sene, vice president and CTO for WellPoint, a \$20 billion health insurance company. The nation's second-largest health insurer, WellPoint uses IBM's MQSeries Integrator middleware to form a bridge between the legacy systems that process member claims and the Web-based, IVR and EDI customer-facing systems so that its employees can better serve customer needs.

But despite all the talk of standards, Prebon's Sanderson, a veteran user of all the big-name middleware packages, remains skeptical that proprietary middleware schemes are a thing of the past. "They can talk openness and standards, but I have to sign the checks. It's a

the financial services industry, which competes on being able to serve its customers better information faster than its competitors. "Technology is a key differentiator in what they do," says Austvold. "They are taking on quite a burden in terms of managing different technologies and vendor relationships, but it may well be worth it."

What makes this complexity worthwhile is the ability to put information in the hands of those who did not have it before. Steve Elkins, manager of business intelligence for Capella University in Minneapolis, used Ascential's MetaStage tool to let his users perform their own queries on a new data warehouse. Previously, if the school's dean wanted to see how many students failed the advanced management course, for instance, he would have had to ask an IT person to query the legacy reporting database and then wait days or weeks for the result. Now, Ascential's DataStage product pulls the data from Capella's business systems and delivers it to the data warehouse. Ascential MetaStage provides the "data dictionary" that makes the data in the warehouse understandable for the school's users. Brio's business intelligence tool then acts as the user interface for both the data from the data warehouse and the explanatory meta-data in the MetaStage data dictionary.

"The large middleware vendors are seeing the benefits of being open. They're not 100 percent there, but they are much more open than they were."

—Barney Sene, VP and CTO for WellPoint

fairly obvious strategy [to push a single architecture], I don't blame them for it," he says. On the other hand, he doesn't want anything to do with it. Sanderson and Patrick McGrath, head of technical strategy, are pursuing a strictly best-of-breed integration approach; a strategy predicated on open standards.

Sanderson has the luxury of spending the money necessary for best of breed since he is in

Since MetaStage maps types of data from one application (such as the warehouse) to another (such as the business intelligence tool), MetaStage effectively integrates the two, making data accessible where it was not before. Previously, only three IT people at Capella were skilled enough to know how to query the legacy reporting database. With MetaStage doing the heavy lifting of translating between

Middleware Keeps Growing

By 2008, application integration software license revenue is expected to grow to **\$3.1B**, up from **\$1.4B** in 2003.

SOURCE: Wintergreen Research

applications and serving the data in an easily comprehensible format, now more than 100 university personnel can do their own queries, greatly improving productivity.

Striving for Simplicity

Increased end-use efficiency isn't the only goal of modern middleware; one of the biggest trends is to simplify maintenance tasks as much as possible, thereby reducing costs. Toward that end, WellPoint's Sene recently began evaluating technology from a startup called Pantero. Pantero's Shared Data Services (SDS) tool reconciles the inconsistencies in data between WellPoint's many enterprise systems. Pantero SDS manages the rules that govern data usage and interpretation so that data is interoperable and accessible across the organization. "Pantero runs on top of our systems and makes it easier to build and manage the adapters and connectors that bridge the systems," says Sene. The key to Pantero is reusability. "You can have hundreds of those adapters and connectors and it is a huge maintenance nightmare. Pantero helps us manage them. I don't have to hire as many people to do the hard coding for those connectors. It's a major cost reduction," says Sene.

Like Ascential's MetaStage, Pantero also does data mapping between systems so that there is a common representation of data for various entities in the enterprise. "We have a common data model and we map all our legacy systems to the model. It makes things much easier. We're not doing it manually, so

UNDER DEVELOPMENT

our costs are reduced,” says Sene. Sene has built an SOA in which nuggets of software functionality can be reused among systems.

To Guido Sacchi, speed and agility are the best payoffs of standardizing the data architecture. “Connecting our systems via standards shrinks our time-to-market,” says Sacchi, CIO at CompuCredit, an Atlanta-based credit card and financial services company. “We need fast integration of credit portfolios that we acquire and high efficiency in our collections.” For example, CompuCredit telephone agents no longer need to put customers on hold to consult other parts of the organization, since they can access the information they need directly, reducing call times and increasing customer satisfaction. Sacchi uses an SOA based on middleware from Software AG in conjunction with a variety of standards, including XML, SOAP and UDDI (Universal Description, Discovery and Integration). The new architecture builds interoperability between different systems and databases. It gives all users the “one version of the truth” (where everyone sees the same data) because of an XML meta-data repository. The business advantages include better customer service, more exact tailoring of product offerings and better information for the agents.

So many businesses have benefited from the integration through middleware that they have had a powerful collective effect—even on the world economy as a whole, according to Austvold. And while it’s certainly far from the only reason (outsourcing and consolidation also play a large role), middleware’s efficiency is even contributing to the so-called jobless recovery, he notes. Integration technology has helped industries from manufacturing to telecommunications cut masses of employees. Those jobs are not coming back any time soon—bittersweet testimony to the success of what was born as middleware two decades ago.

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Dialing for the Web

CELL PHONES | Cell phones and the Web. The two work together tittully at best—with users forced to view stripped-down versions of full webpages and apps, or be stuck typing away at clumsy physical or touch-screen keyboards. But Finnish firm MyOrigo says it has better things in mind, thanks to a quartet of technologies that collectively create the “MyDevice” phone that could find its way into the U.S. market in the near future.

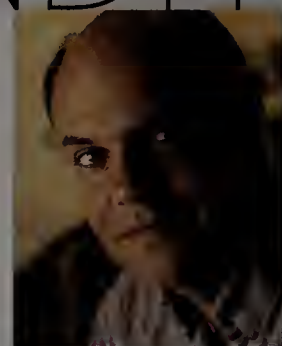
The company’s **Motion Control** tool lets devices automatically switch from a portrait to a landscape view of screen data. The **My Book User Interface** lets users flip through virtual “pages” of information by running a finger across the touchscreen. And the touchscreen has its own innovations; its **Touch and Feel** feature offers tactile feedback (in the form of small vibrations), providing a more typing-conducive experience than standard touchscreens. Finally, the **Mirroring** feature lets users scroll around a page using tilting hand movements instead of scroll bars or directional buttons.

“All the user interfaces that we have now in mobile phones, their backgrounds are in

the late ’60s and early ’70s,” says J-P Metsavainio, company founder. “Originally those user interfaces were designed for static workstations.” The new tools, he says, create a “dynamic way to use dynamic devices.”

Metsavainio also claims that the interface tools could let service providers offer increasingly complicated applications, as the user interface on a MyOrigo-outfitted phone would provide less of a barrier to usage. And cost, he notes, shouldn’t be an obstacle to finding partners. The MyOrigo system is “4 percent hardware and 96 percent software,” he claims, with the hardware being readily available. As a result, MyOrigo systems need not be vastly more expensive than traditional cell phones.

The key, of course, is getting phone companies to buy into the technology. MyOrigo has at least one deal with a major manufacturer, though Metsavainio could not release the name. He did note, however, that phones based on the technology will ship in Europe later this year. The company is also looking for partners to license the technology in the United States. —Christopher Lindquist



Everything Old Is Old Again

BY ERIC KNORR

The mainframe soldiers on, but the clock is ticking on legacy apps

LEGACY SYSTEMS | A couple of months ago I was invited to a 40th birthday celebration for the IBM System/360 mainframe at the Computer History Museum in Silicon Valley. I can't say I was thrilled at the prospect, but I came away inspired. Launch team members described the incredible risk and resources (\$5 billion in early 1960s' dollars) that went into the project. And of course, they were puffed with pride that the 360 has lasted so long.

What's behind the staying power? Part of the answer probably lies in the 360's OS—which Fred Brooks, Jr., who led the development of the 360, calls “the first industrial-strength, 24/7 operating system.” The ability to assume a computer would be up rather than down cemented “IBM mainframe” and “reliability” in people's heads.

But for mainframes generically, that reputation derived from ironclad procedure as much as anything else. My father-in-law, Clark Jones, programmed IBM 360s and RCA Spectra 70s in the 1960s and 1970s. He likes to talk about mainframe culture and rigorous “change control,” contrasting it with the PC server culture of “whiz kids” who never learned the basic operational rules necessary to avoid costly mistakes.

My father-in-law retired a few years ago, and therein lies the mainframe's biggest problem. Many businesses seem to be happy to run their big iron indefinitely, but people who know Cobol or PL/1 are getting harder to find.

According to Gartner, the number of Cobol programmers will decline from just shy of 2 million this year to 1.5 million in 2007. You may not need to power down the mainframe next week, but it's certainly time to think ahead about moving off it.

There are two smart approaches to the transition. You can retire mainframe applications piece by piece and replace them with, say, Java apps running on an app server. This results in what IBM calls “mixed workload” apps that span the mainframe and other platforms. But it also demands Cobol expertise that may not be available.

The other approach involves moving mainframe apps to another platform in one piece, more or less. Micro Focus in April announced a partnership with Microsoft to provide software that enables CICS applications written in Cobol to run on Windows. After they move the code, developers can use Visual Studio to modify the Cobol, or they can work around the legacy app, using Web services and native .Net languages like Visual Basic or C#.

“What people have figured out is they're paying obscene quantities of money,” says Charles Fitzgerald, Microsoft's general manager of platform strategies, who observes that mainframe MIPS costs three orders of magnitude more than Intel MIPS. “The thing that's really preserved the mainframe over the past couple of years has not been performance; it hasn't been throughput, because those

An Intel-based Dell server tricked out with all the redundancy extras probably delivers uptime comparable to that of an IBM zSeries.

—Eric Knorr

things turn out to be terrible,” Fitzgerald asserts. “It's been the set of operational practices that have been codified around it.” Naturally, Fitzgerald is convinced that this rigor is making its way onto server-based platforms.

Maybe so. Microsoft has certainly been addressing Windows' reliability and security in a very public way. And BEA Systems and IBM routinely promote the bulletproof character of their Java platforms. As for hardware, an Intel-based Dell server tricked out with all the redundancy extras probably delivers uptime comparable to that of an IBM zSeries. But you can't get away from the fact that IT is a victim of its own success: Far more people touch enterprise apps and hardware than they did four decades ago, which can't help but increase risk. And ultimately, much of the modern hype about always-on utility or on-demand computing amounts to a yearning for those predictable days when guys in white coats roamed air-conditioned rooms.

Eric Knorr is executive editor at large for *InfoWorld*. He can be reached at eknorr@pacbell.net.

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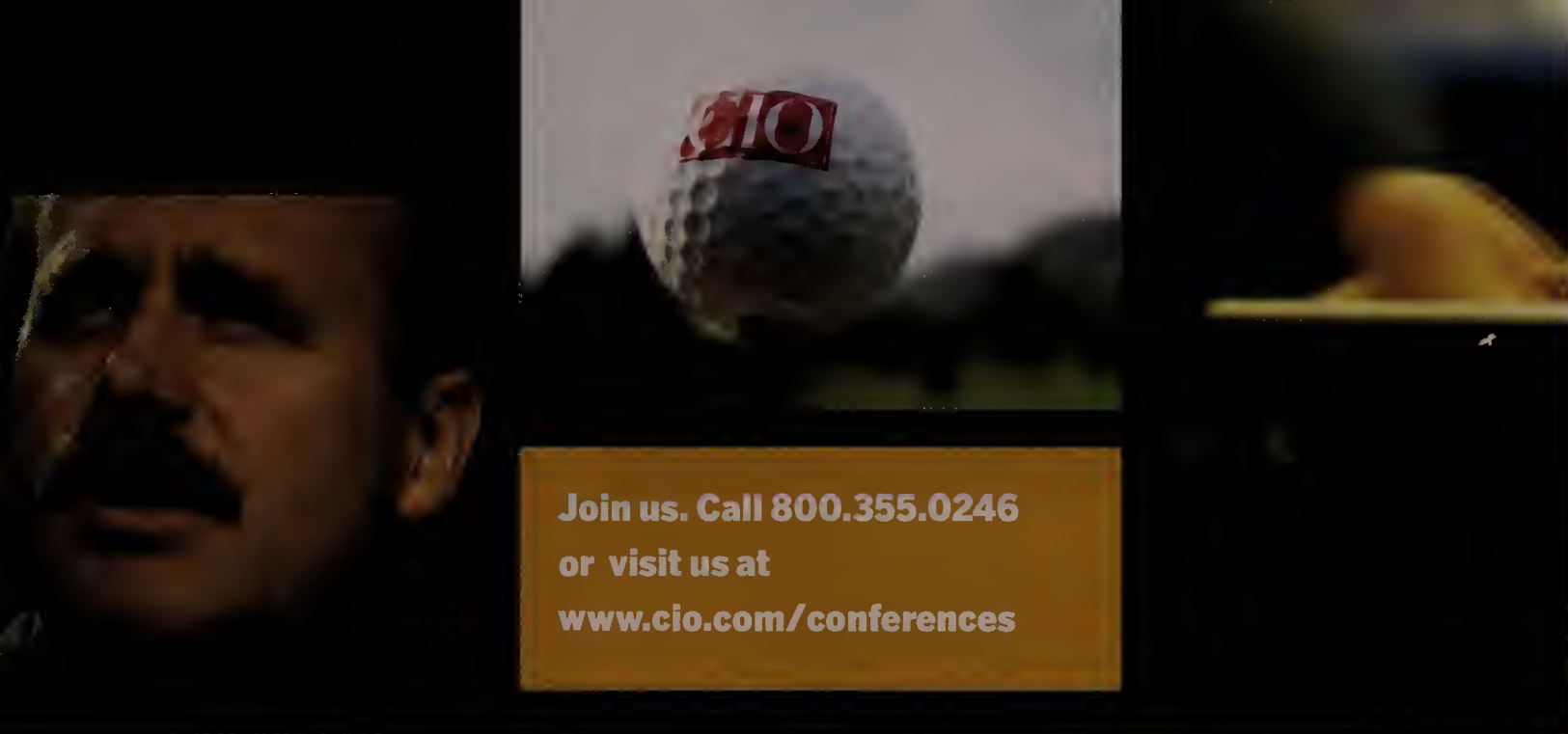
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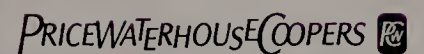
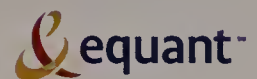
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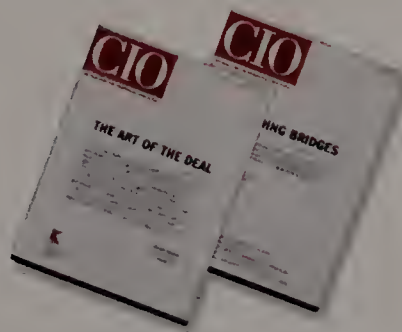
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EXECUTIVE Summaries

June 15, 2004

COVER STORY

Nike Rebounds—How (and Why) Nike Recovered from Its Supply Chain Disaster

By Christopher Koch | 56

The lesson of Nike's failure and subsequent rebound from the 2000 i2 disaster, in which faulty demand-forecasting software cost the company \$100 million in lost sales, lies in the fact that it kept its eyes on the prize. It had a business case that was widely understood and accepted at every level of the company—the goal of driving its manufacturing cycle for a sneaker down from nine months to six. The overarching IT strategy for reaching this goal has always been and continues to be an enterprisewide, fully integrated single-instance ERP implementation. Now in its seventh year of development, Nike has stayed the course on the ERP effort, due to wrap up in 2006, despite going \$100 million over the original \$400 million estimated investment. It's determined not to repeat the mistakes that derailed the i2 implementation—poor integration, inadequate training, unstable software and spotty testing.

“For the people who follow this sort of thing, we became a poster child for failed implementations.”

—ROLAND WOLFRAM, VP AND
GENERAL MANAGER OF NIKE'S
ASIA-PACIFIC DIVISION

Offshore Regulations: What to Worry About

By Ben Worthen | 64

MOVING JOBS OFFSHORE is now as political as it is economic. The business community has made preserving the right to offshore a top priority, while worker advocates are lobbying for measures that restrict offshoring, mostly at the state level. Public-sector CIOs and those whose companies have state or federal contracts face the most immediate risk of legislation limiting how they can source their work. Health-care and financial services CIOs face more risk because of the sensitive nature of the data they handle. CIOs need to consider ways to mitigate the effects of potential legislation. Options include breaking large IT projects into smaller chunks to create opportunities for small, domestic companies to source them. CIOs can physically separate their workforce for government projects from nongovernment workers. And they must be sensitive to the political and public relations ramifications of entering into big offshore agreements between now and the November election.

All Hands on Tech

By Todd Datz | 72

CUNARD'S QUEEN MARY 2, which took its maiden voyage in January, is a floating city with integrated systems—most oriented around passenger services, including ID-card IT—that arguably make it the most technologically advanced vessel on the ocean. But designing and installing her IT was far from smooth sailing. Cunard hadn't built a ship in more than 30 years, and it lacked a separate shipbuilding IT division, which some cruise lines have. In addition, the QM2 is a new class of ship, so there was no preexisting design guidance. The IT crew didn't even have access to the ship (which was constructed in France) until late in the building process. This story looks at what was done to create a seamless, sophisticated, IT-enabled customer experience for passengers who pay as much as \$37,500 for trans-Atlantic passage.

Four Concept Computers

By Galen Gruman | 81

THIS YEAR, TWO NEW TYPES OF PCs vie to replace the traditional desktop and notebook: the blade PC and the modular PC. Even the common PC and notebook designs are changing. Analysts, however, are betting on the evolutionary designs rather than the revolutionary ones. The blade PC systems offer centralized, secured management advantages similar to the mainframe and terminal while providing a standard Windows environment. The so-called modular PC is a handheld device that runs standard Windows XP and thus conventional PC applications. The goal is to give mobile users a full PC experience on the go without the inconvenience of a notebook's weight or size. Adaptable notebooks can be broken down into tablets or handhelds. And integrated PCs will have network connectors and video display adapters—once separate add-in cards—built into the motherboard. Firewire and USB 2.0 ports will make it easier to add storage devices, digital cameras, printers and more as needed.

Essential Technology: Middleware

By Lauren Gibbons Paul | 89

WHILE NO ONE TALKS ABOUT middleware much anymore, it's far from gone. To keep up with the current drive toward open standards and increased flexibility, middleware vendors have adopted new names for what they offer. But whether you're talking business process management, service-oriented architectures, an enterprise service bus or even Web services, they all have some roots in classic middleware. The key for CIOs now is deciphering the new marketing terms to discover how modern middleware can still help a business.

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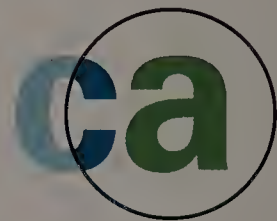
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